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In
Zusammenarbeit
mit der
Arbeitsstelle
Friedensforschung
Bonn
(Leiterin:
Dr. Regine Mehl)

Mit Unterstützung
der Evangelischen
Kirche in Hessen
und Nassau

und der
Berghof Stiftung
für
Konfliktforschung
GmbH

Bernd W. Kubbig (HSFK):

The American Physicists and Ballistic Missile Defense: Past and Present

The Historic Involvement of the APS in the Context of SDI¹

The threat from ballistic missiles, the costs, the implications for the international strategic environment and for arms control, and technological feasibility – these are the four criteria that President Clinton established for his decision as to whether or not to deploy a National Missile Defense (NMD) system as an additional means of countering the perceived threats from weapons of mass destruction (WMD) in countries such as North Korea, Iran, Iraq, Syria, and Libya. On this basis, President Clinton decided on 1 September 2000 ‘not to decide’ on the deployment issue and, instead, to leave the decision to his successor.

The technical issues were probably decisive in determining Clinton’s position: the NMD tests had revealed how immature and unproven the technology behind the whole enterprise was – and will continue to be for the next American President.

It was against this background that in autumn 2000 the American Physical Society (APS) appointed a panel to decide whether the organization should carry out a scientific study on technical aspects of the National Missile Defense system. The committee will have to weigh up all the aspects of such an endeavor, including: the frame and scope of the study, how it is to be funded, and whether it should be conducted in cooperation with the new administration and on the basis of classified data, or by the APS alone, on the basis of publicly available information.

These questions have already been discussed in great detail once before, in the context of the Strategic Defense Initiative (SDI). On that occasion, in similar circumstances, the Society opted to conduct a study on Directed Energy Weapons (DEW) – the technological mainstay of President Reagan’s initial SDI concept. The DEW report was an important factor in prompting the Reagan administration to shift its SDI course in favor of kinetic weapons.

¹ This is the summary of PRIFS latest research report: Bernd W. Kubbig, The American Physical Society’s Directed Energy Weapons Study: Genesis, Influence on the Strategic Defense Initiative, and Lessons for Renewed APS Involvement During the George W. Bush Administration, Research Report, PRIF, January 2001. It can be ordered for 10 DM at: Hessische Stiftung Friedens- und Konfliktforschung, Leimenrode 29, D-60322 Frankfurt am Main, Germany.

My report is intended as an aid to the deliberations of the current APS panel. It describes the activities that led to the establishment of the former Study Group, and the process by which funding was secured for it (chapters 2 and 3). It examines the close interaction between the authors and the Reagan administration (chapter 3); and it shows how consensus was reached, particularly on the report's summary and conclusions (chapter 4). It reviews the discussions that went on within the Society about a political declaration on SDI (chapter 5); and, finally, it outlines the public debates triggered by the publication of the DEW study in April 1987 (chapter 6) and assesses its influence (chapter 7). The report is based mainly on unpublished internal APS material, answers to a standardized questionnaire sent out to the authors of the study, and detailed interviews with several of the latter. A condensed version of a more detailed study, it highlights what are likely to be the major issues for the current APS committee. This summary is structured along similar lines.

Discussing the Option of an APS Study on SDI

When the Council of the American Physical Society discussed the study project for the first time in June 1983, it decided to appoint a special advisory group, made up of prominent physicists with proven expertise in research and development. The group, covering the entire professional spectrum, met in July to discuss a range of possible arms control topics with physics-related and technological content. It was these aspects of directed energy weapons that ultimately emerged as the focal point of the study. The eleven-person advisory group agreed that the sort of study envisaged, based on unclassified information, was possible and would enrich the public debate, and it recommended unanimously to the APS Council that it should produce a publication of this kind.

On 20 November 1983, the APS Council passed a resolution to sponsor and publish an unclassified DEW study. However, the two chairpersons, Nicolaas Bloembergen and Kumar Patel, made their involvement in the project dependent on a major shift in this position: the authors-to-be must have the widest possible access to classified information ('security clearance'). Only if this were the case would the project be armed against the predictable criticism that the authors were not in a position to make scientific/technological judgements about the SDI project because they were not abreast of the latest developments in SDI-related research.

This implied there would have to be a degree of readiness to cooperate on the part of the administration. The physicists were therefore keen to get cooperation with the military in the Department of Defense under way on as broad a basis as possible, and to get formal back-up from key decision-makers in the Pentagon and White House. It was especially the access to classified information that set this publication apart from all previously published studies on SDI – but which also necessitated considerable concessions on the part of the physicists.

Securing Political and Financial Support – Hopes and Fears

These modifications to the project's basic premises considerably delayed the whole enterprise. Written pledges of cooperation by the Strategic Defense Initiative Organization's Director, General Abrahamson, and Science Adviser George Keyworth did not arrive until June 1985. On the advice of SDIO Deputy Director and Chief Scientist Gerold Yonas, APS Executive Secretary William Havens had drafted relevant letters for both Abrahamson and Keyworth, and the two officials then sent these, virtually unchanged, to APS President Robert Wilson, agreeing to close cooperation. At the same time, the APS was looking for appropriate

institutions to fund the project. It originally wanted two-thirds of the money to come from foundations and one third from an institution such as the National Science Foundation which, although perceived by the public to be independent of government, also implied there was government support for the project. By the end of 1984, however, the physicists had begun to consider other sources of funding, and had sought Keyworth's advice on this.

The overall situation in regard to funding was indeed bleak: at the beginning of 1985, the physicists learned that the National Science Foundation had rejected their project-proposal; initial APS inquiries in the Department of Energy yielded essentially negative results; and the possibility of Pentagon funding appeared still to be excluded. To some members of the group, Keyworth's Office of Science and Technology in the White House seemed the last hope. The aim of recruiting the White House as a sponsor represented a considerable departure from the mode of funding pursued up to then – and from the APS's mandate to produce an informed and independent study. In fact, the administration ultimately did not provide any financial support. The final sum obtained remained at \$US400,000 and came exclusively from non-governmental sponsors: in April 1985, the MacArthur Foundation, like the Carnegie Corporation a little under a year before, decided to make \$US200,000 available for the APS project. The Study Group's overspend on the total sum received was only \$US28,090.55.

Selection Criteria and Appointing Mechanism

The procedure for selecting the authors proved difficult and contentious, whereas the composition of the Review Committee presented relatively few problems. The criteria used were partly scientific/technical and partly political. The authors had, first and foremost, to fulfill the requirements of objectivity, excellence, and proven expertise. In addition, they were to have clearance to inspect relevant information at the highest possible level. The APS Council stipulated that the scientists must not have declared themselves publicly for or against the Strategic Defense Initiative. Any impression of political bias had to be avoided.

Although this incompatibility criterion was not rigorously observed, for a period during the selection process it favored the advocates of the armaments program over its critics and opponents, excluding as it did virtually a whole category of skeptical scientists. According to Bloembergen, the APS Council's resolution required that at least four members – in other words approximately a quarter of the whole Study Group – should be working full-time on SDI projects. The longer the selection process dragged on, the more difficult it became to find skeptics with in-depth technical knowledge.

Almost all the candidates nominated by Bloembergen and Patel and approved by the selection committee agreed to become members of the Study Group. Disagreement persisted over the (un)balanced membership and over possible conflicts of interest on the part of the authors. In the run-up to the constituent meeting in early 1985, doubts had emerged as to whether two particular collaborators on the study – Petras Avizonis of the Air Force Weapons Laboratory, and Bruce Miller of the Sandia National Laboratory – satisfied the APS criteria, given that, so it was claimed, they might be too deeply involved in SDI-related programs in their main occupations. Reservations were signaled by no less a figure than SDIO Chief Scientist Gerold Yonas. The fear was that a combination such as this could undermine the public's image of the Study Group as an objective body. From the second half of the year onwards, as a result of the changes in personnel and of the recruitment of the SDI skeptics/opponents, the Study Group could, within the chosen spectrum, be regarded as being essentially balanced in terms of institutional affiliation and political position.

The APS ‘Pact with the Pentagon’: Promises and Problems

By and large, cooperation in the period of the ‘briefings’—which were based almost exclusively on classified information—proceeded smoothly. The author team, the Department of Defense, and occasionally the Defense National Agency (DNA, one branch of the Pentagon’s secret services), worked hand in hand. The leadership of the Study Group, and the individual members, obtained all the data they requested at the clearance level appropriate to them. The group also sometimes drafted the agendas in collaboration with the Department of Energy and also the DNA.

At the end of September 1986, the completed 800-page report was sent off to the SDIO for a security check. All the members assumed it contained no classified information. The report had been re-checked for this by the authors—some of whom were, of course, employed in top posts in secret SDI projects and/or had access to highly classified information. The officials at the Pentagon had followed the author team’s progress in every section, and were familiar with the contents.

The Reagan administration’s policy on classification issues now became clear. As part of the ‘Pact with the Pentagon’, the Study Group’s partner in cooperation now swapped roles and became the scrutineer of the group’s findings. The government bureaucrats’ hour had come – though not necessarily that of the previous partners in cooperation at the SDIO. The release was considerably delayed. At the meeting held shortly before Christmas 1986, the SDIO officials announced to the members of the Study Group that roughly half the report must be rated as classified. They went through the manuscript paragraph by paragraph.

The Pentagon officials made “several informal suggestions for major changes in the report” (APS Executive Secretary William Havens), but the physicists stood firm and refused to accept the changes. After a detailed discussion, both sides eventually agreed a final version, and the Study Group then incorporated the agreed modifications. It took almost three more months for the SDIO to release the study. All in all, the Study Group seems to have succeeded in getting its way, thus proving itself, in essence, highly independent.

The Design of the DEW Study and its Consensual Results

The conditions for cooperation negotiated between the APS and Abrahamson/Keyworth were crucial in terms of the design and conduct of the project. They stated that no explicitly political topics were to be examined and that kinetic weapons – which any new SDI scheme could adopt as a replacement for the exotic weapons being analyzed – were to be excluded. Both the completed study and the process by which it was produced show that the authors fulfilled these requirements, and show how productively they dealt with them. The authors emphasized that they were concerned, not to evaluate the actual SDI program of the time, but to create an analytical framework that could serve as a benchmark for other scientists.

This ‘strategy of depoliticization’ undoubtedly helped with the process of recruiting, and retaining, the Department of Defense as a partner in cooperation. The author group began by drawing up a scientific compendium on directed energy weapons. This was their way of demonstrating their expertise to the no doubt not entirely trusting Pentagon, and of seeking to prove their credibility. But the author team did not stop at a simple treatise on the physical aspects. Instead, it worked out a scheme that allowed the authors to use their basic knowledge to draw technically sound, plausible conclusions in regard to SDI. These conclusions, also kept within scientific/technological bounds, and the summary of the report, were not explicitly political, but they did have political relevance. One of the major challenges, particularly for the two leaders, was to frame the report in a way that

fostered consensus, or to design it in such a way as to minimize or avoid dissension. Patel and Bloembergen made a masterful job of this.

When questioned, all the authors agreed that it had been easy to reach consensus on the technical aspects. Differences of opinion arose on the question of how particular parameters should be defined, how problems should be formulated, and what aspects should be included or excluded. There were also controversies between skeptics/opponents and proponents of SDI over which aspects of the report should remain secret and which should be published: the critics wanted as much information as possible to be published as unclassified in the report; the advocates were more cautious. But here too it proved possible to strike compromises.

The major difficulties were encountered when the politically diverse Study Group set about drafting the summary and twenty-six conclusions based on their scientific/technological findings. A period of intensive debate ensued. Because the whole impact of the study ultimately depended on how the summary was drawn up, the latter proved even worse than the conclusions in terms of sparking major differences of opinion amongst the authors. The authors nonetheless managed to broker a number of compromises—albeit with a good deal more effort than had been required to agree on the scientific/technological core of the report. Thus it was that the experts could present their compromise findings, critical of SDI, in an authoritative and unanimous way to world opinion.

Controversies Inside and Outside the APS

In parallel with the writing of the report, members of the Society discussed whether the Council, as the Society's highest-ranking body, should speak out *ex cathedra* against SDI, on behalf of all APS members, and, if so, at what point it should do this. In August 1985, APS President Robert Wilson had called on physicists to express their opinion as to how the Society should react to SDI.² Of the flood of 167 letters received in response, 31 had been opposed on principle to any political intervention. A day after publication of the study, the Council issued a brief political statement. Purely in terms of content, it reflected the worries of more than three-quarters of the APS physicists who had responded to the call.

Whether for deliberate political reasons or through sheer mismanagement, the Council failed to inform the leadership and members of the Study Group about the political declaration – or at least about the date on which it was to be issued. A storm of indignation broke out amongst the Study Group's authors—irrespective of their stance on SDI—because they saw the statement as an attack on their scientific mandate. The resultant dispute, conducted for the most part within the confines of the Society, turned out, at least in retrospect, to be a storm in a teacup.

Outside the Society, the DEW report encountered only minimal criticism, most of it from the two well-known missile defense enthusiasts Lowell Wood and Gregory Canavan, who were part of a close-knit network of 'early deployers' in Congress. But the critics did not prevail—either on matters of substance or politically. The cooperation between the Study Group and the Reagan administration once again paid off. On all but a few points, the government was forced to stand by its former partner in cooperation and underwrite its basic criticism of an SDI concept based on exotic weapons. This strong coalition left the critics of the DEW study isolated. All seventeen members of the Study Group stood, to a man, behind the radical criticisms of the long-dominant

² For a systematic presentation (unfortunately only available in German at this time) of the responses see: <http://www.hsfk.de/fg1/proj/abm/bulletin/pdfs/apsbrief.pdf>.

concept of the Strategic Defense Initiative. Amongst them were individuals employed full-time on SDI projects financed by the Pentagon.

The Influence of the DEW Study

Despite the overwhelmingly positive reception given to the APS report in the media, it did not mark the start of a shift in trend *in the public arena*. Rather, the DEW study reinforced and lent solidity to those elements of the opinion-forming elite's public discourse on security that were critical of SDI. For the 'Star Wars' enthusiasts, whose credibility had now diminished, it became more difficult to 'sell' SDI projects with unjustified claims. This delegitimizing process, to which the study also contributed, should not be underestimated. It was the first consensual and authoritative specialist publication confined to scientific/technological matters and compiled by leading experts. This was one of the major reasons for the extraordinary regard paid to it. *As to Congress*, the report vindicated the trend toward reducing the SDI budget and giving the legislature greater control over the distribution of monies for the individual programs. Calls for the Strategic Defense Initiative to be left as a research program and for the funds to be distributed according to strict criteria grew louder.

The influence of the DEW report on *the administration's* further management of the Strategic Defense Initiative was two-edged. On the one hand it can be seen as *one* important factor behind the efforts made within the executive to get the exotic weapons-based concept jettisoned. On the other hand the Reagan administration demonstrated its bureaucratic and political power by shifting its focus to kinetic weapons. The critical tenor of the report produced hardly any impact on the DEW budget: expenditure on the directed energy weapons criticized in the study showed only a slight downward movement over the next few years. Most importantly, the increases for kinetic weapons almost equaled the reductions for exotic technologies.

Interestingly, the newly favored kinetic weapons – whose explicit exclusion from the study had been part of the 'Pact with the Pentagon'—were also eventually deemed technologically unreliable. An evaluation of them had been conducted in parallel with the APS project, by specialists coming mainly from industry (the 'Everett Group'). The group's results were presented in June 1987, two months after the publication of the APS report, and were immediately declared 'classified' by the Pentagon. The key findings nevertheless became known. They were as devastating for the new SDI design as the APS study had been for the old. The group expressed fundamental objections to the newly favored architecture of space-based and land-based kinetic weapons. There was not even enough of a basis to make an informed decision about early deployment, and the plans for such deployment therefore remained a paper tiger.

As to the arms control aspect: the question arises as to whether the considerable delay in publishing the DEW report resulted in opportunities being missed. Publication in spring 1986 rather than April 1987 might have been more advantageous in terms of slowing down the dynamics of SDI. And although we cannot be sure that an earlier report by the prestigious Society would have succeeded in dispelling the magic of the weapons under investigation, such a possibility cannot be entirely dismissed.

Having weighed up all the relevant aspects, my report concludes (chapter 8) that the right course of action for the newly elected APS committee is to recommend the conduct of a scientific study into the technical dimensions of the National Missile Defense system. In contrast to the situation in the Reagan era, the technological dimension has now become an integral part of national legislation, following the approval by Congress of two relevant bills, adopted in March 1999 with an overwhelming majority and signed into law on 23 July 1999: "It is the policy of the United States

to deploy as soon as is technologically possible an effective National Missile Defense system capable of defending the territory of the United States against limited ballistic missile attack (...).”

It therefore seems – even from a non-American perspective – that the American Physical Society will inevitably once again become actively involved in the ballistic missile defense debate.

Lessons for Renewed APS Involvement in the Current NMD Program

If history is any guide, the current APS panel will face more or less the same problems and promises as its predecessors. In the case of SDI, the actors concerned wisely opted to subject a key aspect of the initiative to scientific analysis, thus making a unique and important contribution to the debate about a crucial security issue and at the same time continuing the politico-ethical tradition of the American Physical Society, which urges involvement and commitment.

Renewed scientific involvement by the American Physical Society seems – at least from the perspective of a non-American outsider – to be imperative, given that the technical-scientific issues continue to be hotly disputed. Such issues may, moreover, prove to be the key factor when the new administration and new Congress come to decide the future direction and pace of National Missile Defense – much more so than the other three criteria established by President Clinton (threat, cost, and implications for the international strategic situation, particularly arms control). Whether or not this proves to be the case, the panel appointed by the American Physical Society should base its decision on its own list of priorities, derived from its own view of its role as a scientific organization.

The crucial question that the committee will have to consider is whether (unlimited) access to secret information is a necessary precondition to its approving of a scientific report. The panel will have to weigh up the pros and cons carefully. As my case-study suggests, the arguments put forward in the eighties, to the effect that a study should only be conducted on the basis of unlimited access to classified knowledge, ultimately paid off. As explained, this was the basis on which Patel and Bloembergen had been prepared to assume direction of the Study Group. They feared the ‘killer’ objection put forward by the missile defense champions in the Pentagon and the various laboratories, namely that if access were (strictly) limited to unclassified technology, this would create a situation in which critics could (and would) resort to the ‘If you knew what we know...’ argument.

The approach favored by the two leaders of the author team and adopted by the American Physical Society is vindicated by a further experience APS had after the study was finished: the cooperation founded on the written assurances of SDIO Director Abrahamson and Science Adviser Keyworth acted as a form of self-imposed restraint on the Pentagon when the study was sent to it for clearance. A similar effect was produced by the fierce opposition which the report elicited from, essentially, two critics from the physics community, Gregory Canavan and Lowell Wood, who proved to be exceptionally well connected with the politically powerful and well-organized supporters of ballistic missile defense in Congress. On all but a few points, the Reagan administration had no choice but to close ranks with their former partners – with whom they had worked extremely closely over a considerable time-span, and to whom they had supplied classified data. This strong coalition left the critics of the DEW report in splendid isolation. As indicated in the case study, it would have been more difficult for the physicists to control the discourse if they had been confronted with a coalition of administration and critics.

Once it has officially made up its mind to produce a report (whether classified or unclassified), the APS will probably be in a strong negotiating position *vis-à-vis* the new administration, in terms of acting as a partner in cooperation. It is worth remembering that former Science Adviser Keyworth was initially nervous at the prospect of an APS study based on non-classified material, as this would mean that the executive branch had no control over the design, the writing and the publication of the report. As I write this, it is hard to tell whether the White House and Pentagon in particular are inclined to ‘play it again’. As well as the Society’s own determination to commission a study, one has to consider the general political mood in regard to the deployment of a National Missile Defense system – particularly in the newly elected Congress.

One can do no more than speculate here. If there is a Republican administration, the Democrats in both Republican-dominated chambers will probably vote more along party lines on NMD-related issues (as they did until March 1999). This may result in a more critical attitude toward plans for NMD deployment, expressing itself in demands for transparent, realistic, and hence credible standards for an NMD testing-policy, which, at the end of the Clinton era, has become highly politicized. The new administration in Washington may well decide not to repeat the cooperative exercise with the Society. Be that as it may, the APS panel itself should also consider arguments that are critical of another joint effort and that may support the case for an APS report based on publicly available information only:

1. It should be remembered that in the initial stages of the project, the experts involved (many of whom had years of experience of working with governments of various complexions) had unanimously concluded that a study based on publicly available information would indeed be worthwhile.
2. As also shown in the case-study, the ‘Pact with the Pentagon’ also had its pitfalls. The effect of government intervention and control had been particularly marked on the scope of the analysis: the Study Group had agreed to focus on exotic weapons and had largely ignored the kinetic technology which became the nucleus of all later SDI concepts. This deal thus enabled the Department of Defense to embark on the very SDI architecture excluded from the Study Group’s remit.
3. In addition to this serious constraint, there was the fact that the APS’s partner in cooperation, the Pentagon, also controlled the timing, and this led to considerable delays. The cooperative nature of the project placed the scientists in a situation of dependency, especially at the beginning, when they were kept waiting for months for the written assurances from Keyworth and Abrahamson. The joint endeavor was particularly at risk during this period, as it was not clear whether the administration would cooperate. This is a difficult all-or-nothing situation for a community that lays stress on independence as a key feature of its self-image. The sighs of relief in the Society’s Washington office in June 1985 (“Hurrah! Abrahamson letter is in hand”) are entirely understandable. The current APS panel may want to consider whether this situation, and the risk of jeopardizing the whole project, should be repeated. It would seem advisable for the APS to have an alternative strategy (or fall-back position) which would allow it to conduct a study of its own even if the new administration did not want to repeat the joint effort.

However significant the question of access to classified information may be for the APS body currently deliberating the options, the case-study points to a number of other factors as being of importance. These include the balanced composition of the scientist group, the prestige which individual members enjoyed as specialists in their fields, and the authoritative nature of the overall findings, based on consensus. Congressional freshmen Davis and Weldon, it will be remembered, felt constrained to apologize for their misplaced zeal when they realized the Study Group consisted of first-rate experts enjoying the highest distinction both inside and outside the United States. The

fact that the Study Group had produced a unanimous report was one of the reasons for the report's influence.

By once again following its previous path, the renowned American Physical Society will, as in the 1980s, surely make a key contribution to the scientific/technological aspects of the missile defense debate – a contribution of a kind which it alone is able to provide. This role of committed yet critical scientific observer must not be confused with any manifestly political pronouncements on the part of the Society. The clear demarcation between solid specialist investigation and equally legitimate political pronouncement is one which the APS should continue to insist on. Moreover, in honoring its own objective of independence, the American Physical Society should take care to consider whether it is advisable to apply to government agencies such as the Department of Energy or White House for funding. This, too, would be to learn from the experiences of the 1980s and to avoid repeating errors.

Though a European perspective may not be a crucial one to an American organization, it is worth pointing out that another study on BMD-related issues could serve as a useful model for other reports by physicists and engineers in this area: after all, BMD encompasses not only on NMD, but also theater missile defense aspects that will probably trigger a lot of controversies in Europe and in other regions as well.

Against this backdrop, the American Physical Society is well advised to 'play it again'.