
International Armaments Codevelopment: Nunn Amendment Spurs Interest in Collaboration on Weapons Development.

By

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Since the 1960s, NATO planners have been aware that the Alliance was suffering from a diversity of equipment, a problem unknown to the Soviet bloc. Consequently, improvements have been sought to perfect the use of our military resources for a better combat capability. Commonalty of weapons has usually been attained through the purchase of weapons from other members of the Alliance or through the use of cooperative production ventures, the most frequently used and the most successful of our collaborative efforts to date. Programs such as the F-16 have given credence to the possibilities of joint manufacturing of the same system. In the mid 1970s Thomas A Callaghan, Jr. recognized the burden of duplication of research and development (R&D) spending within NATO, and he decried the misguided development of three new main battle tanks for the Alliance, just one example of what he referred to as almost totally duplicative R&D between NATO and the U.S.[1] Consequently for the maximum benefits to accrue to the members of the Alliance, the next step in cooperation must be codevelopment, the joint design and acquisition of a single system, not just its manufacture. While this represents a giant step forward in collaborative efforts, Congressional action in 1985 sponsored by Senators Nunn, Roth, and Warner have given impetus to serious consideration of joint development programs with our allies.

A driving factor in the push for codeveloped systems is the growth in cost of each new edition of a weapon system. Among the principal cost drivers is the cost of research and development as designers try to attain greater technological superiority. Coupled with the increased sophistication is the long time need to keep design teams together. For combat aircraft in Europe, for example, during the last twenty five years, the portion of aircraft cost devoted to R&D has grown from about 15 percent to around 30.[2] As former Assistant Secretary of the Army, Norman R. Augustine, has pointed out, at times facetiously, the unit cost of military equipment is increasing at an exponential rate with respect to time. Thus, the cost of an individual fighter aircraft has grown by a factor of four every ten years since the days of the Wright brothers.[3] While the same trends are observed in the cost of other major weapons, the rate of growth is less for systems that are not so technologically sophisticated.

This phenomenon is not unique to the United States. European aircraft designers are suffering similar raises in costs. In France the Mirage F1 which entered service in the 1970s cost five times as much in constant 1975 dollars as the Ouragan, the first jet fighter produced in France after World War II. The Mirage 2000 was estimated to be twice as expensive as the F1.[4]

A result of this high unit cost has been the procurement of fewer units with each succeeding generation of weapons, thus making the pro rata share of R&D even higher. The high cost of military aircraft has consequences for the aerospace industries of Europe as well, since higher costs will mean smaller production runs. The West German Air Force operated 624 F-104s but now flies only 322 Tornados. Similarly, the F-4s in use in the German forces will be replaced by only about 170 of the German version of the planned European Fighter Aircraft.[5] In Sweden, too, the proposed number of the JAS-39 Gripen to be built will be only about 140, compared to the previous 330 Viggen fighters employed by the Swedish Air Force.[6]

Thomas Callaghan, long a dominant voice in the search for increased cooperation between the U.S. and its allies, refers to this development of multiple similar systems and concomitant reductions in the output of weapons as "structural disarmament." [7] It is Callaghan's contention that all national defense markets, including that of the U.S., are too small to permit the luxury of unnecessary duplication of developing like weapon systems. Even with the size of the American defense market, most major weapon systems are produced at rates below those needed for economic efficiency, especially after the initial outfitting of U.S. forces. The Congressional Budget office has reported, for example, that production of the F-15 should have been at the rate of 120 per year; however, the Air Force bought only an average of 41 aircraft annually. [8] Production of aircraft at rates far below those dictated by good economic sense have raised the price of aircraft to as much as 25 percent of the annual military aircraft procurement budget. [9] With continuing pressure on the defense budget, it is unlikely that Congress will appropriate sufficient funds to procure economically sound quantities of weapons, and this problem will intensify.

For adherents of cooperation such as Callaghan, the solution is to abandon the parochialism of the national market and to enter into genuine cooperative efforts to develop systems which can serve the Alliance as a whole while reducing R&D expenditures. Beginning in the mid-1970s, American policy makers pushed for greater international cooperation. Early Congressional statements, such as the Culver-Nunn Amendments to the Defense Authorization Acts of 1976 and 1977, emphasized that American weapons should be standardized, or at least interoperable, with those of our allies, and encouraged reliance on licensing and coproduction arrangements. [10] This seemingly common-sense solution has been difficult to implement, however, especially in programs involving the U.S. While West European cooperation has resulted in the joint development of the Tornado, Jaguar, Alpha-Jet, Roland, and Milan, transatlantic cooperation has usually taken the form of coproduction, most notably in programs such as the F-16, NATO Seasparrow, and the AIM-9L. Successful collaboration in development between the U.S. and Europe, however, includes a much smaller list, with the AV-8B Harrier and the NATO Seagat being the most prominent. [11]

More recently, however, the Nunn-Roth-Warner Amendment to the FY 86 Defense Authorization Bill (usually referred to simply as the Nunn Amendment) has given a push to codevelopment projects. The Amendment has fenced off \$200 million per year for five years strictly for cooperative development projects between the U.S. and its allies. The Amendment also made available \$50 million for side-by-side testing of European weapons systems to encourage the procurement of off-the-shelf foreign systems. This latter initiative is intended to promote direct purchases of military equipment from Europe or licensed production by U.S. firms of European-designed equipment without costly, time-consuming efforts in the U.S. [12] With funds available to pursue collaborative possibilities, the Services now have an incentive to look at international projects rather than expressing reluctance because of uncertain funding. [13] The Nunn Amendment has given impetus and visibility to U.S. efforts to collaborate in arms development with its NATO allies and is an unequivocal endorsement of armaments cooperation as the method of achieving equipment modernization within NATO while providing equitable burden sharing. Under the Nunn Amendment, potential cooperative projects are proposed by the Services, DOD agencies such as Defense Advanced Research Projects Agency (DARPA), or NATO allies. The Office of the Secretary of Defense screens and prioritizes the proposals and selects those to be included in the budget for funding under the terms of the Amendment. [14] The strategy employed by OSD is to use Nunn funds for the first two years of a cooperative project and then continue it in the third year with Service funds. Thus, new ideas can be launched with the Nunn appropriations but must survive on their own merits after two years. Monies can then be released for more new projects. [15] Dennis Kloske, the Defense Department's special advisor on NATO armaments, sees the Nunn Amendment as the start of institutionalizing arms cooperation and a way to let the

Europeans know that the U.S. is now serious about this proposal.[16] A sample of programs selected for funding under the Nunn Amendment are shown in Table 1.

TABLE 1
Selected Nunn Amendment Candidate Programs

Enhanced Fighter Maneuverability Advanced Sea Mine
NATO Frigate Replacement (NFR 90)
155mm Autonomous Precision Guided Munition
Modular Standoff Weapons
Alternative Warheads--Army Tactical Missile System
HAWK Mobility Enhancement
F-16 Agile Falcon
Surface Ship Torpedo Defense
Light-weight Tank Armament System
Post 2000 Tactical Communications Hypervelocity Projectile

Source:USA(D)/IPT/NATO-Europe

The push from Congress has also grabbed the attention of both top civilian and military leaders at the Pentagon. In his 6 June 1985 memorandum to the highest level of DOD management, then Secretary of Defense Casper Weinberger stressed that collective security increasingly depends on integrating military requirements with defense-industrial cooperation throughout the Alliance. Weinberger addressed the transfer of technology question by establishing a goal of joint access to the best possible technologies to avoid unnecessary duplication of development. At the same time, he cited the economies of scale that could be achieved by coordinating R&D as well as production and logistics support.[17] Weinberger's memorandum directed DOD leaders to stress the importance of cooperative programs, to consult with the allies concerning operational and design requirements of future weapons system, to insure that NATO industrial sources are considered during equipment acquisitions, and to develop an educational program within the Services to develop support for armaments cooperation. [On this latter point, see the article "Educational Initiatives in International Armaments Cooperation by the Defense Systems Management College," elsewhere in this issue.]

But it is not just the U.S. government that is making strides towards better cooperation. The Europeans themselves have also taken steps to improve the harmonization of their military acquisitions. NATO recently took a major step toward improved armaments cooperation by establishing a new armaments planning system. Under the system, Alliance members will submit a list of future defense needs to the NATO Conventional Armaments Review Committee. The list will project military needs for at least ten years, rather than the six years currently projected in NATO planning. Officials hope this system will enable governments to consider cooperative programs earlier in the procurement cycle.[18]

Although the Nunn Amendment provides an administrative framework for undertaking collaborative development, it cannot by itself cause many of the issues which underlie codevelopment to disappear. The question is not simply one of enhancing the use of military resources, but it suggests policies of substantial political interest. All nations are interested in maintaining their own research and development base as an integral part of their sovereignty. Consequently, defense research is often viewed as a critical element of national security policy. The desire to have a fully developed state-of-the-art arms industry has led many nations to emphasize their role in the development of the most sophisticated systems rather than being relegated to the production of technologically inferior equipment. Defense production emits an

aura of power that is substantially different from other forms of economic activity. As former Commerce Department official Clyde Prestowitz put it, "Countries that make airplanes and electronics have greater power than those that just grow wheat and cut down trees." [19] Thus, technology is the *sine qua non* of a powerful and prosperous nation. The practical importance to a country's engineers of being involved in the development of new systems can be seen in the remarks of Yoshito Sasaki, Managing Director of Mitsubishi's Aircraft and Special Vehicle Division, when he discussed the desire of Japan to develop its own FSX fighter. Sasaki noted that while the Japanese Defense Agency was having problems with its fleet of aging F-4s, engineers who had been associated with the development of the Japanese F-1 were much more able to solve the problems. He found that the engineers trained in development could respond more quickly, and consequently, Japan sought to augment the country's engineering skills through the development of another aircraft. [20]

Technology transfer is an important aspect in codevelopment. Many developing European industries see the possibility of such transfers as a means of obtaining expensive high technology without the years of painstaking research normally necessary to achieve a breakthrough. U.S. proponents view technology transfers as a necessary part of collaboration, but one that must be handled with caution. American reluctance to share certain technologies has political, military, and industrial roots. U.S. defense firms are reluctant to give up their lead in emerging technologies, and they are supported by Congressmen who fear the loss of jobs to foreign competitors. Sharing this technological base is also suspect in the sense that it may chip away at the U.S. industrial base with resultant dependency on foreign sources for defense technologies. [21] Thus, there is the fear that the defense industrial base will be weakened and unable to respond to defense needs in times of crisis. As a recent Office of Technology Assessment report points out, the dilemma pits the least-risk approach of satisfying all of our defense requirements from domestic suppliers against the risk of losing access to technology which is not developed in the U.S. or can only be developed at extreme cost. While the most common focus of codevelopment is on cost savings, detractors fear that the dangers which would result outweigh any savings which might accrue through use of suppliers abroad. [22] In addressing the concern of many in the U.S., Deputy Secretary of Defense Taft has noted that we are creating our own competition by helping European industries through technology transfer. Nonetheless, he favors a free market in armaments trade, but one that would be consistent with American industrial base requirements. Taft lauds the free market idea as a healthy one which could strengthen the European defense industry and result in cheaper and more capable arms for the Alliance as a whole. [23] Ultimately it is in the interest of the United States to have a strong European partner which provides an effective contribution to the collective defense.

For a number of years, a consortium of European countries has been planning the development of the next generation European Fighter Aircraft (EFA). Although there has always been a question whether American participation was desired or even if it would be allowed, Secretary of Defense Weinberger made it clear that the U.S. was willing to cooperate. [24] The U.S. has tried to thwart a totally European EFA by offering European participants the opportunity to codevelop a fighter such as Agile Falcon or Hornet 2000 which would be used in Europe as well as sold elsewhere. The Europeans however, have rejected this approach in spite of its appeal of having up to two-thirds the cost of developing the EFA funded by the U.S. There is a real fear that in such a program the U.S. would completely dominate the program, thus furthering the demise of Europe's aircraft design capabilities. [25] However, a more positive possibility for future transatlantic collaboration is that a substantial European R&D effort will build confidence in the Europeans' capabilities so that they could participate on a more equal footing with U.S. partners. [26]

While there is the fear that full-flown cooperation will be deleterious to U.S. defense industries, there are still those who can cite real advantages to participation in cooperative ventures. American industry could embrace armaments cooperation as a means to generate new products,

enter new markets, increase business, and share in development expenses.[27] Major benefits of industrial teaming include drawing on the strengths of each partner to produce better systems, reduction in research and development costs, and elimination of duplication to create a more economical and better coordinated defense posture, providing economic benefits to all partners.[28]

Countries interested in codevelopment are also interested in insuring that the resulting share of work that is placed in the country is in consonance with the funds allocated to the program. Because of work-share requirements which are built into such projects, prime contractors must place subcontracts with companies in each participating nation. This placement is often based upon the percentage of funds contributed to the project or the percentage of the weapons to be bought by each participant. The importance of factors other than military effectiveness and industrial efficiency have led to decisions that swell development costs. When nations are concerned with retaining or creating economic benefits for their ailing defense industries, efficiency gets lost in the shuffle. Cooperative projects are then forced to include technologically inferior industries from participating nations rather than simply selecting the best qualified industries for the job.[29]

Third-country sales of weapons which are commonly developed can be a key issue in the technology transfer debate.[30] Since export sales permit longer production runs with resulting lower unit costs for domestic weapons, international sales are frequently an essential aspect of weapon program planning. However, since the Arms Export Control Act of 1976 gives the U.S. the right to veto third country sales of weapons with American components, many countries are reluctant to use U.S. equipment if that might result in the loss of foreign sales which would be prohibited only to suit U.S. interests. Since these re-export restrictions also apply to coproduced systems, there has been a tendency to avoid U.S. materiel to eliminate the imposition of American foreign policy concerns on nations with different interests.[31]

One of the principal difficulties encountered in the codevelopment of weapon systems is that all participants must agree on the characteristics the weapon will have. For example, in the NATO frigate (NFR-90) program, in which eight countries are involved in the project definition phase, there is no firm accord on whether the frigate's anti-air warfare capability should provide only for local area defense or whether the ships should have separate point-defense and medium-range capabilities. In addition, there is little agreement on the anti-submarine warfare (ASW) capabilities of the frigate, nor even its size, as the ship has been variously viewed as ranging from 3,000 to 5,000 tons.[32]

Organizational difficulties often plague all cooperative programs and are especially prevalent in codevelopment efforts where there may not even be solid agreement on equipment capabilities. An answer is often to rely on multinational committees to try and manage the program. Because many joint ventures are managed by committee, these ventures lack the dynamic leadership of typical prime-subcontractor relationships. The Modular Standoff Weapons (MSOW) program has been set up to avoid these "management-by-committee" difficulties. An International Program Office at Eglin AFB has day-to-day control of the program under the guidance of the NATO steering Committee-Management Group.[33] In this program, the U.S. is serving as the host nation, not the lead nation. Although the program will use the U.S. contracting system, the program office is not part of the Air Force Systems Command, but is subject to the multinational steering committee and management group which handles policy and political matters.

European interest in cooperative defense arrangements are especially important among the nations of the European Economic Community. On January 1, 1993, the integration of the European economies will take a giant step forward as existing trade barriers are dismantled. Many European leaders support the creation at the same time of a European common market in armaments.[34] The fear of losing a nation's sovereignty in defense matters may be hastened by the need to have defense firms in Europe which are large enough in scale to compete with those in

the United States. Multinational consortia such as that in operation with the European Fighter Aircraft will probably be the norm in the future as firms attempt to exploit their technological advantages in the continent-wide market.

As a question of policy, there are those who question whether the approach offered by the Nunn Amendment of encouraging a variety of cooperative programs is the correct course. Kloske advocates pursuing a few high-impact programs with a small number of participants, since the larger the group of participating nations and industries, the more complex the negotiation process and the management procedures.[35] In a large program where significant R&D costs could be saved, the benefits to the participating countries would be greatest and possibly act as encouragement towards future efforts. On the other hand, Senator Nunn believes that NATO should immerse itself in a large number of programs "so that we do not look at each one as *the* test program, so that if it fails the whole concept has failed." [36] Ambassador Abshire also favors an aggressive attitude toward increased transatlantic cooperation since "each success will fuel additional Alliance efforts to seek rewarding cooperative ventures." [37] By concentrating on smaller projects where the benefits may not be so high in each project, there could nonetheless be created a culture for cooperation which would be conducive to even more and larger cooperative ventures.

C.D. Vollmer, a vice president of General Dynamics, has succinctly captured the difficulties presented by international collaboration. "If you favor allied cooperation, a common mobilization base, and a way to reduce the cost of U.S. weapon systems, then it is good. If you are worried about erosion of U.S. competitiveness, technology transfer, and the loss of a significant part of the U.S. export market, then it is not so good." [38] Perhaps the Nunn Amendment will permit us to engage in programs which will yield the benefits of reducing the costs of weapon system development for all the participants while at the same time protecting the technological sovereignty which is so important to all.

NOTES

1. Thomas A. Callaghan, Jr., *U.S./European Cooperation in Military and Civil Technology*, (Washington DC: The Center for Strategic and International Studies, September 1975), p. 21.
2. Francois Heisbourge, "Public Policy and European Arms Market" in Pauline Creasey and Simon May, eds., *The European Armaments Market and Procurement Cooperation*, (New York: St. Martin's Press, 1988), p. 17.
3. Normal R. Augustine, "One Plane, One Tank, One Ship: Trend for the Future?" *Defense Management Journal* 11 (April 1975), pp: 34-40. Augustine also included this point in *Augustine's Laws and Major System Development Programs*, New York: American Institute of Aeronautics and Astronautics, 1983.
4. Edward A Kolodziej, *Making and Marketing Arms: The French Experience and Its Implications for the International System*, (Princeton, NJ; Princeton University Press, 1987), p. 141.
5. Bernard Udis, *The Challenge to European Industrial Policy: Impacts of Redirected Military Spending*, (Bolder, CO: Westview Press, 1987), p. 70.
6. *Ibid.*, p. 102.
7. Thomas A. Callaghan, Jr., "Structural Disarmament: A Vengeful Phenomenon," *Journal of Defense & Diplomacy* 5 (No. 9, September 1987), p. 28.

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8. Molly Moore, "Arms Stretchouts: Frugal or Wasteful?" *Washington Post*, 14 December 1987, p. 13.
 9. Malcolm Gladwell, "Pentagon Paying High Price for Low Aircraft Production," *Washington Post*, 25 September 1988, p. H-1.
 10. David M. Abshire, "Arms Cooperation in NATO," *Armed Forces Journal International* 123 (December 1985), p. 66.
 11. Pauline Creasey, "Europe Defence Firms in Cooperation Agreements," in Creasey and May, p. 93.
 12. Colin McArthur, "Benefits of Foreign Weapons Testing," *Defense News*, 12 September 1988, p. 32.
 13. Dexter Jerome Smith, "Co-operate, Not Duplicate," *Defense* 11 (July 1987), p. 397.
 14. Office of the Deputy Chief of Staff for Research, Development, and Acquisition, Department of the Air Force. Correspondence concerning NATO Armaments Cooperation. Washington, DC, undated.
 15. Smith, *op. cit.*, pp. 396-397.
 16. Michael Dunn, "Dennis Kloske Talks to D&FA about NATO Armaments Cooperation," *Defense & Foreign Affairs* 15 (April 1987). p. 22.
 17. Office of the Secretary of Defense. Memorandum for the Secretaries of the Military Departments, *et. al.*, concerning Emphasis on NATO Armaments Cooperation, Washington DC, 6 June 1985.
 18. Dan Beyers, "NATO Forms Armaments Planning System," *Defense News*, 11 January 1988, p. 10.
 19. Quoted in Robert L. Kirk, "Competition, Cooperation: a Challenge," *Defense News*, 6 June 1988, p. 24.
 20. Interview with Yoshio Sasaki, *Defense News*, 29 June 1987, p. 30.
 21. Robin Beard, "New NATO Approaches to Improved Armaments Cooperation," *NATO's Sixteen Nations* 31 (November 1986), p. 27.
 22. U.S. Congress, Office of Technology Assessment, *The Defense Technology Base: Introduction and Overview--A Special Report*, OTA-ISC-374 (Washington, DC: Government Printing Office, March 1988), pp. 13-15.
 23. Smith, *op. cit.*, p. 397.
 24. "U.S. Seeks Eurofighter Role," *Defense Week*, 9 December 1985.
 25. James W. Canan, "Farnborough's Star Attraction," *Air Force Magazine* 71 (November 1988), p. 64.
 26. Virginia C. Lopez and Loren Yager, *The U.S. Aerospace Industry and the Trend Toward Internationalization*, (Washington, DC: Aerospace Industries Association of America, Inc), p. 65.
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27. Robert A Wolfe, Vice President, Small Engines Program, Pratt and Whitney Government Products Division. "Joint Research to Produce New Programs." Address to The Financial Times International Collaboration Conference, Paris, France, 10 June 1987.
 28. Henry J. Peppers, " 'Teaming'--Sharing Military and Economic Profits," *NATO's Sixteen Nations* 28 (August-September 1983), p. 48.
 29. John K. Daniels, "NATO Standardization--The Other Side of the Coin," *National Defense* 61 (January-February 1977), p. 302.
 30. Richard D. DeLaur, "Armaments Cooperation with Our Allies," *Signal* 39 (October 1984), p. 47.
 31. Lopez and Yager, p. 63.
 32. Giovanni de Briganti, "Britain, France Blame NFR-90 Problems on Countries' Differences of Opinion," *Defense News*, 18 January 1988, p. 32.
 33. Alan E. Habermusch, "Modular Standoff Weapons Management: The Programme Manager's Perspective." Unpublished manuscript submitted to *NATO's Sixteen Nations*, February 1988.
 34. Giovanni de Briganti, "Europe Gingerly Steps Toward Common Arms Market", *Defense News*, September 19, 1988, p. 1.
 35. Dan Beyers, "Kloske: Choose Ambitious Cooperative Programs," *Defense News* (14 December 1987) p. 4.
 36. Richard Slawsky, "Kill the 'Dog' Programmes," *Jane's Defence Weekly* 7 (11 April 1987), p. 642.
 37. David M. Abshire, "Challenging the Atlantic Alliance: The Development of a Resource Strategy," *Signal* 39 (October 1984), p. 29.
 38. Quoted in John G. Roos, "U.S. Defense Contracting Changes Prompting International Teaming," *Armed Forces Journal International* (January 1989), p. 32.

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