NATO AIRBORNE EARLY WARNING AND CONTROL PROGRAM: INTERNATIONAL COOPERATION OR TUG-OF-WAR

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ABSTRACT

The NATO Airborne Early Warning and Control (AEW&C) Program is the largest cooperative program embarked on by NATO. It was formally launched in December 1978 with ministerial signatures on the Multilateral Memorandum of Understanding (MMOU). That agreement has complex terms regarding national payments for the program including early and late payers and differing shares by components. In addition, statements by ministers appended to the MMOU at the time of signature placed further constraints on the financial aspects of the program. This paper will discuss the financial arrangements of the NATO AEW&C Program and some problems that have arisen from those conditions. It presents some observations that should be instructive for future programs of this nature.

INTRODUCTION

The NATO AEW&C program was formally initiated in December 1978. At that time the defense ministers of twelve NATO nations signed a Multilateral Memorandum of Understanding (MMOU) that reflected their agreement to embark on a program to procure and operate a fleet of 18 NATO E-3A surveillance aircraft as an international NATO force and to modify selected NATO air defense ground environment sites to be compatible with the aircraft. One of those nations, the United Kingdom, additionally agreed to procure eleven NIMROD maritime surveillance aircraft as the principal portion of its contribution to the NATO AEW&C Force. Belgium, the thirteenth participant, agreed to the terms of the MMOU in 1981.

The signing of the MMOU at NATO Headquarters on 6 December 1978 culminated a number of years of negotiations to define the system, cope with financial restrictions, determine national contributions and reach agreement on the myriad aspects associated with a multinational cooperative program. The MMOU included very complex financial terms regarding national contributions. These involved differing national shares for various components of the program with some nations making their payments early while others contributed later. Payments and requirements were also specified in terms of base year (June 1977) dollars. The terms were further complicated by national statements that were made and appended to the document at the time of signature.

The MMOU with its additional restrictions specified by various signatories, was an imperfect document. The imperfections were, and are, considered minor in relation to the precedent-setting aspect of this cooperative program. During the subsequent implementation of the program, however, the participants gained an appreciation of those imperfections and dealt with them to achieve success.

PURPOSE

This paper describes the financial terms of the MMOU and the additional conditions specified by ministers. It presents complications that arose when those terms were implemented and provides some observations that should be instructive when embarking on another multinational cooperative program of this nature. No attempt is made to address these issues in an exhaustive fashion. Rather, the purpose is to highlight some of the financial issues for individuals who are not familiar with the program and who may become involved in the formulation of an international cooperative endeavor in the future.

BACKGROUND

The overall governing body for the program is the NATO AEW&C Program Management Organization (NAPMO) which is personified by a Board of Directors (BOD) including one representative of each member nation. Decisions of the BOD require unanimity. The BOD is supported by three committees: the Legal, Contracts and Finance (LCF) Committee, the Operations and Support (O&S) Committee, and the Technical and Configuration (T&C) Committee. The day-to-day management of the program is accomplished by the NATO AEW&C Program Management Agency (NAPMA) located at Brunssum, the Netherlands. This organization could be considered as an international system program office including personnel from each member nation.

At the time of this writing, nine of the eventual 18 NATO E-3A aircraft have been delivered to the Main Operating Base (MOB) at Geilenkirchen, Germany. The MOB plus two of the four forward operating facilities have been accepted, and over 75 percent of the program contributions have been called. The balance of the aircraft are to be delivered by mid-1985, and the modification of the ground system is scheduled to be completed shortly thereafter.

MMOU TERMS

The MMOU in Section VIII presents the initial program acquisition cost estimates in June 1977 values (Table 1). That includes preparatory activities plus four separate acquisition components: aircraft, ground environment, base facilities and NAPMO administration. The total estimated acquisition cost in June 1977 terms is $1,826 million. The MMOU also specifies an estimate for NATO E-3A annual operations and support costs. From 1986 onward, it is $98.9 million (June 1977).

TABLE 1
NATO AEW&C MMOU

SECTION VIII - Initial Program Cost Estimates

1. Program cost estimates are shown in United States dollars and the June 1977 level of pay and prices.

2. The program cost estimates for a NATO E-3A force incorporating the requirements of this Memorandum are as follows:

Acquisition		Million Dollars
(a) Preparatory Activities:		
- Airborne System	26.2	
- Ground Environment	2.6	
- Facilities	0.8	
- NAPO (Provisional) Admin	5.1	34.7
(b) Aircraft:		
- DDTE	170.8	
- Production (1)	1345.0	1515.8
(c) Ground Environment		159.4
(d) Base Facilities		69.2
(e) NAPMO Administration		46.9
TOTAL ACQUISITION		1826.0

Stable Year Operations and Support (O&S) (2)	$M per year
(a) Aircraft System	98.9
(b) Ground Environment	6.0

NOTES:
(1) Includes initial spare parts.
(2) Amounts for non-stable years (1980-1985) are shown in Appendix K.
(3) For information only, not to be borne by NATO E-3A O&S budget but by existing O&S budgets for the ADGE systems.

Section IX of the MMOU presents the national cost shares of the program funding requirements (Table 2). These shares vary for each of the components. For example, the US shares are aircraft, 44.3208 percent; ground environment, 27.2279 percent; facilities, 30.9390 percent; administration, 38.2005 percent; and operations and support, 41.5272 percent. National shares were based on various formulas including NATO infrastructure funding and gross domestic product adjusted by a number of subjective elements considered during the negotiations. The differences by component were partially based on national benefits that would accrue. For example, a major portion of the aircraft manufacturing effort is being accomplished in the United States, Germany, and Canada. National shares were adjusted to take that factor into account. On the other hand, the facilities effort is based on the infrastructure budget-sharing formula.

TABLE 2
NATO AEW&C MMOU

SECTION IX - Cost Sharing

1. Governments participating in the programme will share the total costs in accordance with the following:

Percentage Shares
Acquisition

Governments	A/C %	G/E %	Facs. %	Admin %	E-3A O&S %
Belgium (BE)	2.2114	5.5520	6.3087	4.5146	3.3871
Canada (CA)	10.2850	6.3132	7.1737	9.1554	9.4265
Denmark (DE)	1.3103	3.7012	4.2057	2.6046	2.0009
Germany (GE)	31.3810	26.3585	29.9512	25.4143	28.1360
Greece (GR)	0.6358	0.7932	0.9013	0.6157	0.6191
Italy (IT)	5.0708	7.9313	9.0123	9.4080	7.2649
Luxembourg (LU)	0.0748	0.2115	0.2403	0.1421	0.1079
Netherlands (NE)	2.9457	5.1026	5.7981	4.4988	3.7479
Norway (NO)	1.0595	3.1197	3.5449	1.8154	1.4590
Portugal (PO)	0.0032	0.3701	0.4206	1.0260	0.6970
Turkey (TU)	0.7017	1.3238	1.5042	2.6046	1.6261
United Kingdom (UK)	--	11.9950	--	--	--
United States (US)	44.3208	27.2279	30.9390	38.2005	41.5275
TOTAL	100.	100.	100.	100.	100.

Several nations established restrictive conditions on their shares, and these conditions were included as footnotes in the table in Section IX of the MMOU. The Turkish government indicated that initially they would not accept their full share. In view of this situation, an unresolved issue was who would pay the balance of the Turkish share, to assure that the proportional distribution among the remaining participants was retained.

Section IX of the MMOU also indicates that the national payments will be adjusted for inflation. It states the "currently estimated total and annual funding requirements from each participating government, based on the anticipated phased funding requirements of the NAPMO to cover all payments against commitments to be incurred are set out in June 1977 US dollars and attached at Appendix G. These . . . are understood to be adjusted by yearly inflation . . . ." Finally, that Section IX concludes that, "Based on Appendix G and subsequent financial plan updates (as required by Section X, paragraph 6) participating governments will ensure that their respective share of the programme funds will be made available to NAPMA on a timely basis."

Appendix G is entitled "Estimated Total Annual Funding Requirements from Participating Governments." It sets out the national distribution of the $1,826 million by nation and by year (see Table 3). From this information it can be seen that the United States', Netherlands', and Canada's contributions are largest in 1980 and 1981, while Germany's are greatest in 1982 and 1983. Several other nations made no contribution to the acquisitions budgets until 1981 or later. It is noteworthy that, while the US contribution to the acquisition phase was approximately 42 percent, our annual percentage share in 1980 was 63 percent. The different phasing of national contributions was necessary because of budgetary constraints from some of the participants. They either could not obtain funds administratively for the initial years or had committed all available funds to other projects.

TABLE 3
NATO AEW&C MMOU, APPENDIX G

ESTIMATED TOTAL AND ANNUAL FUNDING REQUIREMENTS FROM PARTICIPATING GOVERNMENTS

MILLION DOLLARS (JUNE 1977)

NATION	PRIOR TO JUL 78	JUL-DEC 1978	1979	1980	1981	1982	1983	1984	1985	TOTAL
BE	.05				14.13	18.46	11.49	4.77	.96	49.9
CA	.25	2.08	23.34	44.01	49.28	30.86	19.20	7.98	1.60	178.6
DE				4.05	11.97	7.49	4.67	1.94	.38	30.5
GE	4.50	6.00	45.00	55.00	65.00	115.00	157.25	106.06	6.97	560.8
GR	.05				3.40	4.44	2.77	1.15	.23	12.0
IT										102.2
LU	.05	.02	.22	.42	.46	.29	.18	.08	.02	1.7
NE	.05	.71	7.84	14.81	16.59	10.40	6.47	2.68	.54	60.1
NO	.05						10.88	11.57	2.32	24.8
PO	.05				.41	.53	.33	.13	.03	1.5
TU	.05				4.34	5.68	3.54	1.47	.29	15.4
UK	2.80	.19	2.18	4.10	4.59	2.88	1.79	.75	.15	19.4
US	8.50	9.30	104.02	211.44	259.43	138.20	38.09	0.10	0.10	769.0
TOTAL REQUIRED	16.4	18.3	182.6	333.7	429.6	373.2	298.9	156.2	17.1	1,826.0

[Editor's Note: Some of the totals in the above chart do not add up; however, they are reprinted here as they appeared in the original MMOU, Appendix G.]

Section X, paragraph 6 states, "In order to assure adequate programme funding, the NAPMO will arrange for financial plans to be produced and updated at least annually. These plans will identify all anticipated quarterly expenditures for the remainder of the programme in all currencies require."

Based on the foregoing, national contributions varied by program component and over time. In addition, they were "estimated" in 1977 terms and would have to be adjusted for inflation and updated financial plans. The details on how the adjustments would be accomplished have not been developed. The existing arrangement was the result of long and complex negotiations among the participants.

MINISTERS' STATEMENTS

Several ministers stated specific conditions at the time they signed the MMOU. There conditions were appended to the document and had a profound effect on the established arrangements.

First, the Canadian minister stated his nation's acquisition share "should not be more than 9.8 percent of the total, up to but not exceeding 180 million US dollars." (Nine point eight percent of $1,826 million is approximately $179 million.) The Danish minister indicated that country's share of the procurement would be $30.5 million. He added that cost increases other than inflation would not be borne by Denmark. The German minister added that his signature was "based on the expectations that careful cost control should be able to maintain actual German participation to 550 million US dollars at prices of 1977 but in any event to the 30.71 percent as agreed in the financial talks." To these conditional provisions was added the Netherlands minister's statement that his signature was with "the understanding that the Netherlands will not be requested to accept any increase of their total commitment for the AWACS project of 60.1 million dollars indicated in Appendix G to the MMOU, unless all participating nations do likewise." Among other statements made by parties at the time of signature, the Greek minister indicated, "The Greek share of the cost of acquiring the new AEW system should not exceed the amount of 12 million US dollars envisaged in Appendix G to the MMOU . . . ."

For those left to manage the NATO AEW&C program, the financial terms that had been negotiated over several years and were reflected in the MMOU as estimates became ceilings on national contributions as a result of various ministers' statements. Instead of being able to manage to meet the requirements, the amount of funds available very clearly became the independent variable. This factor had a significant impact on the subsequent actions of those associated with the management of the acquisition.

As the program evolved, it was necessary to translate 1977 values of contributions to current year budgets and calls for funds, to ensure that contracts (and any growth) remained within the annual and total funding constraints in 1977 dollar terms and to balance requirements for multiple currencies with changing values of those currencies. All of these financial requirements had to be met while assuring that prescribed national shares were maintained for each major component of the program. The process of demonstrating this latter achievement was called accreditation.

INFLATION

A major issue confronting those charged with implementing the program was the need to convert the June 1977 shares and contribution values into then-year budgets and calls for funds while still preserving the conditions of the MMOU. It would have been a simple matter if each nation contributed its overall share each year. However, this ideal was not the case; some would contribute early while others would pay later. The inflation issue was further complicated because the mix of required national currencies varied over time, and the exchange rate fluctuated. Further, work was performed in a number of countries; and each one had a different inflation rate. In addition to the problems of inflation and fluctuating exchange rates, there was the risk of real cost growth due to contract overruns, schedule changes, and new requirements. Therefore, it was important to separate inflation costs from program change costs and to assure that each cost was equitably shared. All of these factors had to be considered in arriving at an equitable solution. When the MMOU was signed, these issues had been addressed at great length; however, they were not resolved.

One principle of the agreement was that nations would pay their proportionate share of all currencies required in any given year. Therefore, if a nation contributed one-third of the total funds in a specific year, it would provide that same proportion of each required currency. In addition, it was agreed that crediting of contributions would be based on the relative values of currencies at one point in time, i.e., June 1977, and this proportion would not be adjusted. As a result, any risk associated with differing exchange rates would be borne independently by the respective nations. The latter feature had a significant impact on the cost to individual nations. For example, the United States, being an early payer, had to contribute Deutsche Marks (DM) at an adverse rate, \$1 = 1.7 to 1.8 DM, while Germany, later in the program contributed dollars at an unfavorable rate nearly equal, \$1 = 2.6

to 2.7 DM. With agreement on this factor, however, it could be set aside from the inflation payment problem.

Several approaches to inflation sharing were considered. One involved determining the current year's requirements for funds and then deflating them to a base year value using agreed inflation indices. They would then be converted to the June 1977 dollar value, using an accepted exchange rate in order to determine the proportionate national share in accordance with Appendix G of the MMOU. One problem was that the contributions were capped by ministerial statements. Therefore, the amount to be provided as stated in Appendix G was the determining factor, not the annual requirement. Another difficulty was that some nations wanted to be able to plan, significantly head of time, how much they would be required to contribute in any given year.

Another proposed approach was to use a preestablished inflation rate to convert the 1977 contribution levels to current year values and for that to be the limit for the initial call. If additional funds were subsequently required in the year, these would have to be obtained through a supplemental call. This approach would have been feasible if contributions were not limited, but once they were capped by ministerial statements there would be no opportunity for upward adjustments. Under this approach it would be prudent to use a high inflation rate to assure the cash received was sufficient to cover requirements. If funds were left at the end of the year, they could be applied against the next year's requirements. However, during a subsequent year the national shares, currency mixes, and exchange rates would differ. Therefore, a difficulty would arise if funds contributed in one year were used to offset national funding requirements in a succeeding year.

A third approach was for all nations to pay the amount stated in Appendix G of the MMOU in the corresponding year. In addition, each would pay its overall percentage share of the computed inflation each year. Thus, while some nations had no scheduled payment in a specific year they would have to contribute toward the inflation. This alternative was not satisfactory because some participants had already stated they could not contribute in the early years.

A variant of the third approach was also introduced. Contributions toward inflation would be made in the same year that nations were scheduled to pay, according to Appendix G. For a long time, however, the representatives could not agree on the proportionate allocation of inflation. Some maintained that their cumulative share of the total inflation should not exceed their overall contribution share to the entire program. Others maintained that this approach would not take into consideration the early and late payments and would thus allocate a disproportionate share of the inflation to the early contributors. They contended that each nation's annual contribution should be inflated using the agreed indices. Thus, if a nation were scheduled to provide 60 percent of the funds in a given year, according to Appendix G, it would still contribute 60 percent as inflated. As a result, the late payers would provide more total funds to the program, but when deflated to a base year, the overall national shares would be maintained. After extensive negotiations, this last position was accepted. Composite indices based on independent forecasting models or other data were adopted to measure inflation.

In developing budgets, NAPMA determines the projected requirements for the year, stated in multiple currencies. These currencies are deflated to June 1977 values using the agreed inflation rates. Then the currencies are converted to US dollars using June 1977 exchange rates to determine whether the annual limit in the MMOU is matched. If it is not, appropriate adjustments are made. If acquisition funds are available at the end of the year, they are retained but are not used to offset subsequent contributions. Inflation projections are used for budget formulation and calls for funds. After the year end, actual inflation indices are reviewed to determine whether the nations overpaid or underpaid.

With the limitation on annual contributions and following the foregoing approach, there is only an indirect connection between the amount of funds to be provided and the contractual commitments. Specifically, long-term contracts, e.g., aircraft and engines, that included obligations through 1985 or beyond had to be signed in 1979. The amount of funds available each year, however, was capped and depended on the computed inflation rate. As a result, assuring there were sufficient funds required very careful planning -- and some luck. If necessary, short-term commitments could be adjusted, but the major long-term obligations were essentially fixed. Nevertheless, NAPMA and the nations could reasonably predict available funds by following this approach.

INTEREST

NAPMA and the national representatives recognized that actual billings by contractors would probably not follow the same phasing as was estimated to determine the contribution schedule in Appendix G of the MMOU. In fact, because national contributions exceeded contract payments in the early years, NAPMA accumulated significant cash balances in bank accounts and took management actions to maximize the interest on those funds. These actions were authorized under the MMOU which states in Section X, paragraph 5, that, "The NAPMO will make every effort to maximize the interest on the balance of any funds held in the NAPMO accounts." The interest was seen by the participants as a management reserve. This principle was especially important in view of the risk associated with the indirect relationship between national contributions and program requirements and the limits placed on contributions as discussed above.

Nations have agree that if the interest was considered program money and was not identified to any particular nation, it could remain with the program. To date, interest has been used for several purposes. The primary one has been to fund growth in the ground environment component. Germany, however, with very few exceptions, has not authorized the interest to be used without a commensurate blocking of aircraft component funds. In her view, this position maintained the baseline of $1,826 million. Thus, while there is agreement at the moment to permit the NAPMA to accumulate interest, there is not agreement that those funds can be used to augment national contributions beyond $1,826 million.

CROSS COMPONENT TRANSFERS

Another aspect that has arisen is the impact of an overrun in one component versus the underrun in another. At present, the aircraft component is projected to be a significant underrun while the ground environment component is substantially above the original projected cost. It might be a relatively simple matter to transfer funds from the aircraft component to the ground component; however, the national cost shares are different. For example, the overall US share of the aircraft component is 44.3 percent while the US share of the ground environment portion is 27.2 percent. One could consider that if funds are transferred from the aircraft component to the ground component, the United States will be over paid. On the other hand, one could maintain that those component shares were important only to develop the overall program shares; and, as long as the program shares are preserved, the funds should be used where required.

This issue area has not been finally resolved. At present, nations are contributing according to the original MMOU baselines by component, and two funding transfers between components have been authorized. It has been left to final accreditation at the end of the program to determine the extent to which national adjustments should be made for those transfers.

UNRESOLVED ISSUES

At program conclusion, it will be necessary to determine whether the national shares in the MMOU have been retained. The process leading to this determination will have to include consideration of the inflation rates, how much each nation contributed, when funds were provided, the impact of cross component transfers, and other factors the participants consider relevant. The methodology for accomplishing this final accreditation has not been determined.

In addition, it is necessary to resolve whether any remaining interest may be used to augment national contributions, thus permitting some essential enhancements to be incorporated, or whether it will be used to offset contributions that would otherwise be provided from national treasuries.

Another element not yet fully addressed is the set of actions to be taken in the event an overall program underrun is anticipated. It would not be equitable to simply discontinue calling funds because of the different phasing of national contributions. Late payers would have to provide funds to those who had contributed earlier. In addition, if funds were called up to the limit stated in the MMOU, any residual funds could be used for essential operational requirements which have already been validated by NATO.

LESSONS LEARNED

There are a number of lessons learned in implementing the financial aspects of NATO AEW&C program. They include the following:

1. Do not permit any reservations on a Memorandum of Understanding (MOU) to be introduced at the time of signature. Reservations that state a national position, if appended to a signature, become part of the agreement. Therefore, any proposed reservations should be submitted ahead

of time to be thoroughly evaluated, discussed, and if at all possible, resolved.

2. Avoid early and late payer situations, because computation of inflation becomes a very complex and difficult issue. The requirement to compute inflation can be completely avoided if contributions are stated in then-year terms in lieu of base year. Therefore, do not state contributions in base-year terms.

3. Do not include differing national shares for various components of the program; instead, only include overall national shares. The differing national shares constrain flexibility to shift funds among components because of national concerns regarding the impact on overall shares.

4. Avoid limits on funding that inordinately constrain the program and do not permit any management flexibility. With this improvement, state whether interest earned on program funds will be retained by the program and if it will be used to augment or offset national contributions. It is recommended, however, that interest not be retained but instead be credited to nations.

CONCLUSION

The NATO AEW&C acquisition effort was initiated in 1978 and will not be concluded until after 1985. It was preceded by an extended period of negotiations among the participating nations. During negotiations, financial complexities were identified and addressed, but not all were resolved. The Defense Ministers signed an MMOU with known and hidden imperfections plus national conditions and embarked on this cooperative endeavor. Those implementing the program have dealt with financial issues; a number have been resolved, but several remain today. Some will never be solved in a manner that will totally satisfy auditors and accountants. That prediction derives from the nature of the politics of a multilateral cooperative program. Nevertheless, the AWACS aircraft are flying, the modification of the ground system is proceding, and a significant addition has been made to the NATO defensive capability.

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