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- **EAST-WEST RELATIONS**
by M. van der Stoel
- **NEW DIMENSION AT SEA**
by Admiral Isaac C. Kidd, Jr.
- **STANDARDIZATION AND
INTEROPERABILITY**
by Walter LaBerge

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Volume 24

1976

No. 6

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Defence Support Division*

STANDARDIZATION and INTEROPERABILITY: ANOTHER PERSPECTIVE



IT is now eight months since I left the Pentagon for Brussels to become Assistant Secretary General for Defence Support. It has been a time of intense effort, great enjoyment and I hope of significant learning. In this article I wish to catalogue some of my first impressions and perhaps provoke enough argument so that we who are interested in NATO can better understand its

problems and agree on their solution.

During my period of indoctrination I have visited many of the NATO operating commands and most of the Ministries of Defence, talked to many people and in the process formed explicit impressions of our NATO research and development and procurement strengths and weaknesses and what we should and should not do about them.

Before I start this detailed discussion I should admit that, like everyone else, I have developed a pronounced view of the present capability of NATO. Let me describe that view because it colours a great deal of what I will suggest to be the proper NATO action for the future.

Undeniable Capability

It is my view that the NATO Alliance has been, and is now, an instrument of undeniable capability, for which we should

all be thankful and appreciative. The existence of this Alliance capability is not an accident but the result of the working of our free and independent national industrial systems.

It is, however, also my equally strong view that we who belong to the countries of NATO do have a very real and pressing problem that we choose to ignore. That problem is that we, as an Alliance, do not wish to match the Soviet level of spending on war material, nor do we even wish to address the consequence of this situation. If we did face up to it, we should see that an already disproportionate numerical situation is growing worse, and appreciate that our adversaries, by their willingness to spend considerably more than we, will eventually close the quality gap which is still in our favour. In addition to this, they will retain into the future the initiatives of surprise and timing which they now have.

That spectre is the reason for NATO's present initiatives on standardization and interoperability. These initiatives

are especially important since despite the compelling nature of the threat, individual national financial considerations do not seem to allow the NATO Alliance to match Soviet expenditures. So for the time being at least, NATO will have to bridge this expenditure gap by an ability to make better use of what it has.

It has been absolutely obvious to all to whom I have talked, that the method by which research and development and procurement can most cost-effectively contribute to improved military capability is by achieving greater equipment interoperability. This need for interoperability within NATO has been known for a long time. What is new is the military insistence on interoperability and the Defence Ministers' willingness to apply high level NATO and national pressure to bring it about.

As a consequence, in December 1975 the Council in Ministerial session approved the formation of an Ad Hoc Committee on Equipment Interoperability under the direction of the NATO Deputy Secretary General, Ambassador Pansa Cedronio. The terms of reference of that organization are, inter alia: to determine where the capability of allied forces to operate together, or support one another, is seriously constrained due to the lack of interoperability of equipment, and to develop specific recommendations for correcting these major deficiencies as soon as possible. In addition, it should propose procedures for assuring adequate interoperability of equipment which is to be developed and acquired in the future.

Five Problem Areas

As a start, the Ad Hoc Committee established five working

groups in order to evaluate the following problem areas:

1. Tactical area communications,
2. Tactical aircraft rearming,
3. Tank gun ammunition,
4. Fuels,
5. Implementation of NATO standardization and Allied publications.

The Ad Hoc Committee is now coming to the end of its first year and may well be extended by the Council into a second year. The initial effort of the working groups is nearing completion and there is almost universal belief that the groups have been successful in making progress in these five most difficult areas. The Committee's success is in part due to the capability and level of its participants, but, to my mind, it also reflects a new Alliance-wide willingness to insist on, and to achieve, interoperability.

This strong and continuing pressure for interoperability should not lessen in the near future. Surprisingly, the problems of the future appear to be more easily handled than the interoperability problems of the present. However, even in current cases where industrial conflicts exist, strong pressure to find equitable industrial arrangements will make our current problems more tractable.

Some interoperability problems, however, may prove so difficult as to defy simple solution. One of these may be the case of interchangeable ammunition for the Alliance's next generation of main battle tanks. Even there one hopes that the developments of the UK, US, Germany and France can be coordinated to the point where all such ammunition will be interchangeable. Even if this problem were to remain unsolved, it would still be an exception rather than the rule as the majority of new munitions now being designed are intended to be interoperable throughout the Alliance.

In no way does the imposition of interoperability change our basic system. The best example of this is, of course, our commercial communications satellite system, which interoperates with both voice and data circuits among all the free world's telephone and computer subscribers. Nations' industries have found it to their advantage to support these interoperability agreements. The same can be the case for military systems. In fact, as I hope to show later, we are well on the way to solving for the future the impossible problems of today caused by our inattention in the past.

Many people, I know, who argue for improvement have a much less favourable view of our status than the one I have outlined. Though I am personally convinced of the compelling need for increased efficiency because of our unwillingness to match Soviet spending, I must admit to being more than a little irked by the arguments in favour of standardization and interoperability based on allegations of excessive waste and duplication.

These arguments usually compare NATO with a "waste free" perfect world of the writer's own making. However, the experience of many years teaches that we have only a choice of imperfect worlds, not the chance to command our own view of perfection. Two different economic blocs exist today, our competitive free enterprise system which depends to some degree on multiple developments and the Soviet regulated, directed and essentially non-competitive system. Up until now, in both the civilian economy and in the military world, the free enterprise system has proved to be far the superior of the two. Thus as we try to improve the efficiency of free enterprise, we must be careful not to destroy the essence of this efficient, practical and so far successful system, in

favour of a theoretical system which has yet to be shown to be workable.

If improvements are to be made, there must first be a careful evaluation of current efficiency in research, development and procurement. This will be no easy task because efficiency in R & D is difficult to determine. One yardstick which is sometimes used is the proliferation of hardware that we observe in the field today, which probably is "excessive duplication". But that hardware is the result of a research and development response to an environment of 10 or more years ago, when there was low inflation, relatively large budgets, modest development costs and nowhere near the same degree of worry about Russian capabilities. To judge the effectiveness of the use today of our R & D resources requires a subtle subjectivity since the equipments resulting from today's R & D will not be in the field for years to come.

In this connection, let me provide an extract from a note from the Supreme Allied Commander Atlantic (SACLANT) which I received recently. In it, Admiral Kidd lists some examples which I will reproduce.

Successes and Failures

One criterion for a success is the cooperative acquisition of naval armaments by two or more nations within the framework of NATO.

Collaborative efforts by NATO nations that have been successful or have the potential for success are as follows:

Past Successes:

NATO MK 44 torpedo,
NATO MPA aircraft (Atlantic),
NATO Azores fixed acoustic range (AFAR),
NATO acoustic communication with submarines,
NATO Sea Sparrow,
NATO helicopters, Lynx, Puma and Gazelle,

NATO patrol craft hydrofoil missile (PHM),
NATO naval forces sensor and weapon accuracy check sites (FORACS),
NATO frigate for the 1970's,
NATO Sea Gnat system,
NATO conventionally powered submarine for employment in European waters.

Potential for Success

Very short range air defence weapon system,
Explosion resistant multi-influence, sweep system for mines (ERMISSE),
Electro-optical devices,
NATO anti-surface ship missile (ASSM),
NATO small surface-to-air ship self-defence system for the post 1985 time frame (NATO "6S" system).

Other collaborative efforts by NATO nations that have been successful in areas other than naval armaments are as follows:

F104G Starfighter,
Fiat G91 strike fighter,
Hawk missile,
Sidewinder missile,
Bull-pup missile,
AS-30 missile,
Jaguar tactical and training aircraft,
Multi-role combat aircraft (MRCA),
NADGE air defence system (80 sites),
NATO multi-national F-16 air combat fighter,
220 NATO airfields with common communications and pipeline links for support,
28 allied tactical publications (ATP's) containing common doctrine,
53 allied communications publications (ACP's) containing common communications procedures and doctrine,
Nearly 900 standardization agreements (STANAGS) have been made between NATO nations to enable their forces to operate together in the most effective manner.

Other bi-lateral or multi-lateral projects between NATO nations, outside the NATO framework for cooperation, that have been beneficial in achieving greater standardization within NATO.

Harpoon missile,

3 inch/76 millimetre OTO Melara gun,
Terrier missile,
Olympus/Tyne engines,
M20 series fire control systems,
Tri-partite mine counter-measures (MCM) vessel,
Exocet missile.

It is considered that NATO could improve its degree of standardization or interoperability in the following areas:

41 different types of naval guns from 20 mm upwards,
31 different types of anti-tank weapons,
6 different types of recoilless rifle,
36 different types of fire control radars,
8 different SAM systems,
6 different types of anti-surface ship missiles (ASSM's),
Common identification system (IFF),
Common data link,
Nations' implementation of standardization agreements (STANAGS),
NATO RD & P programmes,
Nations to harmonize national armament schedules,
Establish Test and Evaluation programme,
Integrate RD & P of armaments into defence planning process.

Making Headway

Admiral Kidd's assessment as SACLANT seems to me to indicate that NATO is making headway, and should continue to do so. Nearly all his examples of uncorrected difficulties are probably not remediable until the equipments cited are replaced by future generation systems.

The impressive list of collaborative efforts cited by Admiral Kidd constitutes a very important but unrecognised progress towards more common programmes and the efficiency of large scale production and common logistic support in the field. Today, in the whole field of armaments development in Europe, very few, if any, programmes start without cooperation between several nations.

These programmes have developed by the natural process

of nations and their industries determining how to work together to their mutual advantage to meet a military need. Such procedures go a long way towards providing a much greater degree of standardization in NATO than ever before. I personally do not believe that money spent by these nations should count as "waste and inefficiency" just because it duplicates work done elsewhere.

There seems to be in some places a doctrinaire approach to the question of standardization which does not recognise that, in our society, complete standardization is unnatural and, when tried, inefficient. However, it clearly can be applied in far more areas than is presently the case provided we address the fundamental economic problem of how to ensure that

standardization is to the industrial advantage of the nations involved.

Lastly on this point, it is necessary to know what is meant by standardization. Nations have different needs, different replacement schedules, and different budgets; it is only after analysis of all these factors that it is possible to assess, for an individual item, whether standardization is crucial or not.

A recent visit to the Federal Republic of Germany highlighted this problem. While there, I rode in a Leopard I tank and later talked to many developers and field users-to-be about the Leopard II, now projected for early introduction into the German forces. The next day I was briefed most intelligently on the operationally imperative need for standardization. The briefing after that was a description of

the large programme to prepare for their five to ten-year transition to the Leopard II. As it turns out, there is almost nothing of importance in the Leopard II which is drawn from the Leopard I. The gun, the firecontrol, the engine, the ammunition are all different. As far as I could see, the only things standardized were the paint and the fuel. To me, these two briefings showed inconsistent arguments, one insisting on standardization, the other on a long transition period of non-standardization. It would have been possible to build a Leopard II more nearly like a Leopard I as the Soviets have built Mig 21's more nearly like Mig 19's and Mig 17's. Germany did not follow the Russian tradition of standardization, but rather, after evaluating the merits of this particular case, made a clean

Major General

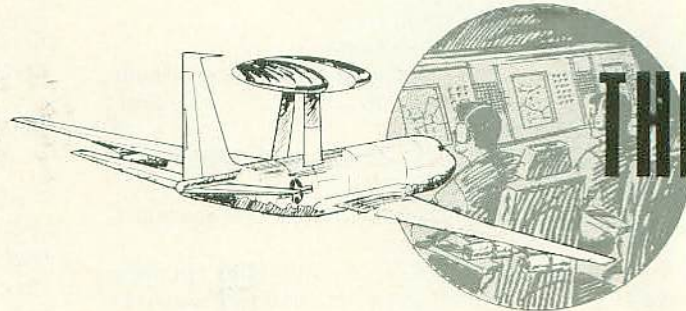
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THE E-3A AIRB

Discussions are currently being held in the Alliance on the feasibility of setting up a NATO Airborne Early Warning (AEW) system. The following article sets out an American view and argues that such a system would enhance NATO's deterrent role by denying an enemy opportunities for preparing and launching a successful surprise attack.

THE lethality and mobility of modern weapons have heightened the appeal of surprise as an element in war, simply because the ability to deliver blows has progressed faster than the ability to absorb them. This gradual swing in the balance of potentials between shock and recovery has steadily increased the importance of surveillance and warning. Weapons and forces are powerful on

both sides of the NATO-Warsaw Pact border. If the NATO early warning network is credible, the sharp edge of surprise in any Warsaw Pact plan of attack will be fragile and suspect, and the deterrence barrier will be high. NATO must, however, have an early warning system which recognizes and grows with Warsaw Pact capabilities. The gaps and limitations in that system, which were once relatively acceptable, are becoming potential avenues for surprise aerial attack. That is central among several reasons for the importance of the NATO airborne early warning (AEW) programme to deterrent strength.

The E-3A Airborne Warning and Control System (AWACS) would enhance deterrence against a conventional Warsaw Pact attack in seven major ways: (1) it would extend the low-altitude radar view of Warsaw Pact territory by as much as 150

break in favour of improved performance. I agree with this decision. The increased performance of the Leopard II will far outweigh the ensuing problems of non-standardization.

All I wish to imply by this example is that the question of when and when not to standardize, is complicated. Another example concerns one of the nations which argues most strongly for NATO standardization. This nation has under development, with intent to deploy in NATO, four different fighter aircraft with four different radars, and three different engine types, each of which is completely different from their main line fighter aircraft now in the field — which, incidentally, is probably still the best in the world. What is euphemistically called a "high-low-mix" is actually an attempt — and a good

one as far as I am concerned — to let the competitive system drive the cost down and the capability up of their entire fighter inventory.

As it is a tricky problem to decide when, from a military standpoint, standardization is imperative and when only an important consideration, I believe that a forum of military and technical experts should evaluate, case by case, the proper course for NATO to follow — standardization or interoperability. It seems to me that NATO already possesses machinery which could be put to this task.

Let me now briefly review this machinery. The Conference of National Armaments Directors (CNAD) is the senior R&D Committee of the Council. CNAD has subsidiary groups which meet regularly to discuss

new technology and developments and their application. In addition, the International Military Staff also has organizations working toward more efficient military operations through better use of standards. These bodies, together with the Ad Hoc Committee on Equipment Interoperability, constitute an apparatus which is working to improve the efficiency and effectiveness of the NATO development and procurement process. It is these bodies which must better understand the implications of standardization and recommend when this course should be insisted upon.

If I may select one of these bodies as an example, the Military Agency for Standardization (MAS) slowly and

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ORNE WARNING and CONTROL SYSTEM, and DETERRENCE IN NATO

nautical miles; (2) it would fill the existing gaps in low-altitude coverage left by the ground-based network; (3) it would offset the vulnerability of ground-based radars; (4) it would overcome quantitative deficiencies by introducing a multiplier effect on other weapons systems; (5) it would lessen the chances of an accidental war, unnecessary escalation, and misdirected use of forces which might come about because of insufficient or incorrect information at key decision points; (6) it would allow NATO forces to circumvent or emasculate some forms of provocation; and (7) it would substantiate NATO political harmony and determination.

Extension of radar coverage well beyond the border area influences deterrence by severely complicating the Warsaw Pact's ability to achieve surprise. Soviet doctrine calls for the massing of

aircraft to lead a blitzkrieg-style offensive against NATO — initially striking air defences, air bases, command and control networks and nuclear resources in a series of intense waves. The existing ground radar network in the Central Region, which has the most sophisticated systems and most comprehensive coverage in NATO, consists of fixed, semi-hardened NADGE/412L installations which can be rapidly supplemented by the Federal Republic of Germany's mobile LARS radars and by the mobile US 407L TACS radars. Even with all of these radars in place, the low altitude view of Warsaw Pact territory is very shallow. Simple curvature of the earth intersects the line of sight from a typical ground-based radar to a target at 300 feet altitude at a range of 19 nautical miles.

Without the mobile radars in place — assuming that the Warsaw Pact has managed to construct an

his relative combat strength is unfavourably altered, the key facets of deterrence — warning, reaction and fighting strength — are significantly bolstered. The E-3A would enhance all of these facets simultaneously.

The E-3A would also add to deterrence in a more subtle manner. The total E-3A radar system, for example, entails maritime surveillance and ground-force monitoring capabilities which, together with the aerial surveillance display, can provide a comprehensive, real-time, integral picture of battle activity on a theatre-wide scale. Such a broad, integral view of aerial and surface activity has never before been possible.

The deterrent implications of this big picture are profound. They lie in the fact that the Warsaw Pact would know that NATO political leaders and joint military commanders could respond to an act of aggression with an unprecedented comprehension of attack patterns and pressures. Aggressive deception would be more difficult and NATO retaliation more incisive than ever before. Key decision-makers, moreover, would share a common core of perception based on information provided from the E-3A, and this core would facilitate the decision-making process. Furthermore, the sophisticated, jam-resistant, survivable communications from the E-3A to the

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methodically (often slower than some people would desire but faster than believed by its critics) has developed, and nations have put into use, a number of standards which are now removing future grounds for non-interoperability which so upset the observer of NATO today.

However, besides this present machinery, other positive steps should also be taken to create a new environment which allows better use of NATO's resources.

Necessary Measures

In the following paragraphs, I have listed what I believe to be five important measures that can be taken to change constructively the environment of our free enterprise system so as to allow it to be more cost effective.

1) *Nations should insist that*

the first goal of national development is effective operation in NATO. This principle is not now applied in any nation of the Alliance; it should be in all. If adopted, this tenet must be buttressed in each nation by a bureaucratic organization sufficiently strong to ensure the achievement of NATO interests. No NATO nation currently has such a bureaucratic or organizational instrument which can represent with authority (by having the power, for example, occasionally to delay or cancel programmes) the needs of NATO. Until nations are willing to make national examination of NATO interoperability and standardization a condition for giving the go-ahead to a programme, all the national exhortations for improvement within NATO are rhetoric, not substance.

2) *Agree that all national programmes at their inception will either obtain certification of*

NATO interoperability or will visibly waive this requirement. This procedure would require nations to present their programmes for review prior to the initiation of advanced development and to have the results of such reviews passed to the highest levels within the developing nation's Ministry of Defence, and also passed through the CNAD to the NATO meeting of Defence Ministers for information and consideration. At present there is no administrative machinery by which CNAD is informed at a sufficiently early stage of development to enable it to negotiate changes which would allow interoperability.

3) *The commitment to transatlantic teaming, as the normal way of dealing with large programmes.* In my view, the equitable trade in military equipments both ways across the Atlantic, or the "two-way street" as it is often called, cannot be developed unless some

various NATO forces and headquarters — particularly after the planned introduction of a joint tactical information distribution system (JTIDS) — would help to offset the dangers of hesitancy and confusion which would appear if primary communications links were disrupted.

Finally, the virtually unprecedented international agreement under which a NATO E-3A force would be purchased — whatever its final form — would foster a perception of NATO cooperation, determination and standardization. These intangible factors, particularly in a period of economic stress, contribute to the factor of will which underlies the physical strength equations in any deterrent effort.

In sum, the E-3A would lift NATO surveillance to the high ground. From that perspective, it would deny the Warsaw Pact its major existing opportunities for strategic and tactical surprise in a conventional attack. These are not static opportunities. They are growing, and must be foreclosed. The E-3A would multiply the fighting effectiveness of NATO forces, from the activity of high-level decision-making to the ability to match a particular weapon to a particular target. This sum of gains in warning confidence and combat strength would, in our view, constitute one of the most significant single forward steps in NATO deterrence since the formation of the Alliance.

NATO programmes are created jointly by teams comprising transatlantic partners. So far nothing concrete has been done to change the traditional US position of not buying a purely European product from Europe. Therefore, however explained or rationalized, this reluctance will most likely continue. If it does, this closing off to Europe of US markets must inevitably lead in self-defence to a closing off by the Europeans of their military market to the US.

This erection of economic barriers is, to my mind, not far-fetched. It will be the immediate and almost inevitable consequence of a Europe determined to save its defence industry, and a US, unwilling for whatever reasons, to buy in equitable amounts from Europe. Were this prediction to come about, the consequences would be rampant non-standardization and probably non-interoperability as well.

In our industrial economy, companies tend to design into their products only those things demanded by their potential customers. Were it otherwise, the products could no longer be cost competitive. Thus if this market isolation becomes a reality, the US will design for US needs, and Europe will design for European needs. As these needs will be different, the hardware will also be different.

No Standardization

Take, for example, the almost classic case of the F-111/MRCA, where two aircraft, one American and the other developed by European partners, have many similar characteristics but have been developed with no standardization apart from the air in the tyres and the fuel in the tanks. Yet both aircraft have essentially the same mission, fly at the same low altitude at the same high speed, have the same aerody-

amic configuration of swing wings, and both have two engines, terrain following radar and similar low altitude bomb release systems.

Even more serious, there will be little or no interoperability in the future munitions of the two aircraft; weapons for the F-111 will be different from, and not interchangeable with, those of the MRCA and vice-versa. This long-term incompatibility arises because in the initial airframe design neither producer considered the other's market as worth designing for.

The consequences of geographic polarization can only be averted if it becomes a conscious policy of the European nations to have an American partner in programmes where they are the prime initiator, and the policy of the US to have a significant European partner who can be a second source producer for those programmes it intends to deploy to NATO.

In my view, if standardization opportunities are really to be expanded, there must be much more extensive examination within NATO on how to create the environment needed to bring about greater cooperation. Licensing methods, dual sources, and offset arrangements must be explored. But, most of all, a commitment of leadership by the US in cross-Atlantic teaming is required, quickly, before the walls of geographic protectionism are erected.

The time to act is now. Three years from now will probably be too late. Once the walls are up it will be hard to bring them down.

4) *Complete Technological Information Sharing.* I believe that useless and needless duplication of effort in NATO can easily result from any conscious hiding of technology discovery among NATO allies. For proprietary reasons, using military security as an excuse, nations sometimes seem to hold back the work of greatest consequence so as to establish a national product position.

We occasionally appear to deny each other knowledge of analyses and test data using the security blanket to achieve a delay for industrial or government exploitation within the discovering country. The result could be that unnecessary tests and trials are reproduced by several countries.

Of greater significance, because of incomplete knowledge, nations might become committed to programmes based on assumptions which would have been greatly dif-

ferent if the technology had been shared.

Lest one say that such situations are improbable, let me add that I know personally that in times past, incomplete information-sharing among nations, for whatever reasons, has existed on new munitions, lasers, electronic countermeasures, infra-red detectors, lookdown radar signal processing, integrated circuit technology, new armour systems, special materials, and many more. We are getting better at sharing information, but in my view have far to go.

This problem of secrecy for industrial reasons has not been endemic to only one side of the ocean.

It may be true that some cases are justified on security grounds and others in order to make the free enterprise system work. However, on a government-to-government basis I believe we should find a way of licensing inventions while maintaining security, so as to protect industrial positions while reducing the waste of multiple effort.

I hope that CNAD and the Alliance nations will continue to be committed to an open sharing of technology.

5) *Early and Accurate Information on Timing of Planned Replacements.* Nations' efforts to combine to develop jointly a new weapon system are greatly impeded by lack of comprehensive Alliance-wide planning information on replacement schedules for equipment now in service. This lack of information was cited by the Military Committee in November 1975 and

confirmed by the CNAD. In its meeting in April 1976 the CNAD asked that a system be proposed by which this integrated planning could be effected.

For the competitive system to work for military acquisition, it is crucial that such integrated acquisition planning exist. By use of these schedules, the equivalent of good commercial market planning can be achieved.

In the commercial motor-car equivalent, private industry must know whether or not to make the large investments necessary to bring out a new model. To know that, industry must understand the market conditions and the effect on sales of delaying or speeding up the introduction of a new product.

This situation has considerable equivalence in military planning since it is the size of the market which determines the degree of increased product cost necessary for amortization of development and production costs.

The development of integrated replacement schedules for some European NATO nations is now being actively undertaken by the European Programme Group. The CNAD is also beginning a programme of a similar nature which, when instituted, will integrate the programmes of all NATO nations. It is to be hoped that the CNAD programme will be able to rely heavily on the work done by the European Programme Group.

These five items are today on

my own list of important measures which will command my personal efforts. I hope that I can convince my associates within the nations to agree that these items are ones with which they can associate themselves, so that, together, we can achieve results.

This article has covered many topics. Let me summarize it in this way. Interoperability is crucial and we are working on it. We are making progress but we must find a way of making it happen automatically. NATO

and the member nations must find procedures and create bureaucratic institutions which force interoperability to be a natural circumstance.

Next most important is to provide a climate which encourages cooperation among nations. First, by early information release on technological opportunities; secondly, by integrated replacement scheduling; and thirdly, by finding a way for transatlantic teaming.

Let me conclude by once again stating the opening pre-

mise. We in NATO have today a good capability, excellent equipment, highly trained personnel and good leadership. We need not be ashamed of our performance over these last 25 years. But we must be prepared to make the necessary improvements so that the Alliance can be as successful in the years ahead. I hope that we have the courage and the foresight to work vigorously on the problem. We on the management side of NATO need to match the dedication and the zeal of our young men in the field.

James G. SAMPAS

CCMS Projects Officer

INTERNATIONAL ACTION NEEDED TO SOLVE ENVIRONMENTAL PROBLEMS

LONG-RANGE transport of air-pollutants and international action to meet disasters associated with the oil industry were but two of the many international issues discussed by NATO's Committee on the Challenges of Modern Society (CCMS) at its Plenary Session held at NATO Headquarters in Brussels on 12-13 October. Concern was also expressed that fluorocarbons must be controlled to stop the danger to the ozone layer. Discussion of these issues came at the traditional Round Table held by the Committee, which was established in late 1969 for the purpose

of catalysing action to meet problems that have a major impact on man's environment and quality of life.

The Session was opened by the Committee Chairman, Secretary General Joseph M.A.H. Luns. Dr Luns underscored the multifaceted nature of environmental problems, pointing out that they had economic, legal, social and political aspects. He emphasized that the protection of the environment cannot be solved by technological adjustments but must be acted upon on a coordinated and global basis.