Portuguese F-16s patrolling the skies over Bosnia

The European Rapid Reaction Force

The Contribution of Aviation Logistics

By Air Commodore Peter Dye RAF

There can be few military projects that have been received with so much scepticism, suspicion and hostility as the European Union (EU)'s proposal to create a European Rapid Reaction Force (ERRF).[1] Some commentators have questioned motive, rationale and practicability while others have expressed deep concerns about the implications for the North Atlantic Treaty Organisation (NATO) and the US–Europe relationship. It might have been thought that, given the long-standing demand for a greater European contribution to the defence of the continent and continuing worries about the US–Europe capability gap exposed in Kosovo, the ERRF initiative would have been warmly welcomed. Instead, notwithstanding strong support amongst the EU governments for a policy that is very much a UK initiative, media criticism has ranged from suggestions that the ERRF is a 'paper tiger' created by federalist politicians playing at 'armchair generals'[2] to fears that it is a barely disguised blueprint for a European Army.[3] Even dispassionate observers have wondered whether the resources will be available and the programmes in place to match the planned institutional changes.[4]

Major changes have occurred in armed forces world-wide – but largely driven by falling defence budgets and rapid downsizing

It would be naïve to suggest that funding issues are likely to be quickly resolved – although some would claim to see glimmers of hope [5] – but this should not hide the fact that a great deal more could be done within existing resource levels. It has been pointed out that the European members of NATO spend 60% of what the US does for about 10% of the military capability.[6] Much of this imbalance is driven by the fragmented, expensive and highly inefficient manner in which weapon systems are procured and supported. It is no exaggeration to claim that logistics is a battlefield on which European military capabilities could be readily improved.

To date, there has been little objective analysis of the progress towards creating a viable European rapid reaction capability. As events in the Gulf, the Balkans and, most recently, Afghanistan have demonstrated, air power remains key to achieving an expeditionary capability. However, European air forces were forged in an era when, with some exceptions, a deployment role was neither required nor envisioned. Moreover, the weapons systems and infrastructure that remain in place, and some still to be introduced, are the product of Cold War procurement and support strategies. Transformation is proving slow and painful.

THE EUROPEAN RAPID REACTION FORCE

The end of the Cold War unleashed a process of major geopolitical uncertainty that continues largely unabated. The creation of a new international system and the emergence of diverse and unfamiliar threats have seen the military struggling to adjust effectively. Major changes have occurred in armed forces world-wide – but largely driven by falling defence budgets and rapid downsizing. The evidence indicates that doctrinal change and the deployment of new capabilities have proved much more difficult to achieve. In assessing the progress of military transformation, the Strategic Survey 2000/2001 has commented that, *'Efforts are likely to be inhibited not only by institutional malaise and caution but also by the fact that most contingencies call for proven capabilities more than untested ones'*.[7] The Gulf War undoubtedly provided momentum for reform and consolidated the move to joint, multinational crisis management operations, but it also exposed the gap between military capabilities and political aspirations. The need to reconcile the two has become, if anything, more pressing over the last decade as a result of the continuing cycle of instability and intervention in the Balkans.

A milestone in this process was the new Strategic Concept, adopted by NATO at the 1991 Rome Summit, that emphasised the greater responsibility to be assumed by the European Allies for their own security. The European Security and Defence Identity (ESDI) was developed further at the Brussels and Berlin Summits, notably in the form of the Combined Joint Task Force (CJTF) intended to provide rapidly deployable, multinational task forces, together with command and control capabilities, for employment in Western European Union (WEU) operations. However, it was not until 1998 – and the Anglo-French agreement at St Malo on carrying forward the ESDI under the aegis of the EU rather than the WEU – that a credible vehicle emerged, in the form of the Common European Policy on Security

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and Defence (CEPSD). Following the endorsement of NATO's 1999 Washington Summit, the European Council moved rapidly to create the structures and mechanisms within this second 'pillar' of the EU.[8]

A common thread throughout this process has been the commitment of both NATO and the EU to intervene militarily in crises outside national or alliance homelands – on the basis of the so-called 'Petersberg tasks' of humanitarian and rescue missions, peacekeeping, peacemaking and crisis management.[9] Indeed, this aspiration has been articulated so frequently that the qualities expected of armed forces in the new environment – rapid, responsive and flexible – have sometimes seemed to represent the end rather than the means. Even so, and despite the popularity of this mantra with defence departments world-wide, such sentiments have generally failed to prove father to the deed.

THE HELSINKI HEADLINE GOAL

The need to take specific action to build the means and capabilities for crisis management under the CEPSD was not lost on the EU. Mindful of the disparity between Europe's ambitions and actual military capabilities, it was decided at the 1999 Helsinki European Council to adopt a common target for deployable military capability; the so-called Helsinki Headline Goal. At the same time it was also agreed to establish the necessary EU bodies to provide co-ordinated political and strategic control of these deployable forces.

The Headline Goal committed the EU member states, by 2003, to be able to deploy rapidly – and support for up to a year – forces capable of the full range of 'Petersberg tasks' in operations up to corps level (some 50,000 to 60,000 personnel). These forces were to be self-sustaining with the necessary command, control and intelligence capabilities, logistics, other combat support services and additionally, as appropriate, air and naval contingents. They were to be capable of being deployed at this level within 60 days as well as providing for smaller rapid response elements at high readiness.

PROGRESS

In the 3 years since Helsinki, progress towards achieving these aims has been rapid although the implication that a full operating capability would be available at the end of 2001 was never a realistic prospect.[10] There is no doubt that the creation of the necessary bodies has moved quickly – the Political and Security Committee (PSC), EU Military Committee (EUMC) and EU Military Staff (EUMS) have already evolved from interim to permanent status.[11] Considerable effort has also been expended in elaborating a Headline Goal target that, as expressed at Helsinki, was more about political commitment than a detailed requirement suitable for military planning purposes. The methodology employed has been to establish a clear strategic context, articulate key planning assumptions,[12] select illustrative scenarios, identify capabilities, develop force packages and, finally, define the full range of requirements.[13]

In parallel with the creation of a full-time EUMS,[14] it was agreed to pursue the necessary enabling work through a Headline Goal Task Force (HTF) comprising individual specialist sub-groups drawn from national military staffs and relying on NATO expertise. The outcome was a 240 page Helsinki Headline Goal Catalogue (HHC) built around 144 generic capabilities under 7 categories: command, control, communication and information (C3I); intelligence, surveillance, target acquisition and reconnaissance (ISTAR); deployability and mobility; effective engagement; protection and survivability; sustainability and logistics; and general support. The document was reviewed at a Capabilities and Commitments Conference held in Brussels on 20 November 2000 during which EU member states nominated provisional national contributions (presented in the form of a Helsinki Force Catalogue), identified shortfalls and agreed on measures to tackle them.

THE AIR COMPONENT

Three generic scenarios formed the basis of the HHC: separation of parties by force (SOPF); conflict prevention/preventative deployment (CP); and assistance to civilians (AsC). The former represented by far the most demanding scenario and the largest resource requirements. The overall force pool was significantly larger than the figure called for at Helsinki because of the need to satisfy the differing operational needs of the 'Petersberg tasks'. Aside from the air contingent, a total of 80,000 ground troops and 80 ships were envisaged out of a pool of 100,000 troops and 100 ships.[15]

The aviation contribution in the SOPF scenario comprised a substantial number of combat and support aircraft.[16] In addition, Heavy Lift (C-17/A400M equivalent), General Cargo Lift (C-130 equivalent) and Passenger Aircraft (A-300/330 equivalent) were needed to meet strategic airlift requirements. The resources involved in sustaining this level of capability were not directly identified, since forces were to be offered on the understanding that they could be sustained for the required period of time. However, during the Gulf War, the ratio of deployed personnel to operational aircraft averaged around 35:1.[17] On this basis, an air component equivalent to the anticipated pool of 400 combat aircraft would necessitate the deployment of an additional 14,000 personnel in-theatre. The strategic lift required to move the associated support and aerospace ground equipment would also be large – amounting to a minimum of 800 C-130 equivalent sorties. This excludes the outload of munitions or any provision for sustainment.[18]

The proposed UK contribution to the air contingent comprised 72 combat aircraft[19] and over 30 support aircraft as well as some 50 transport aircraft dedicated to strategic lift.[20] The majority of these assets would be available at 10–20 days' readiness. Specific logistic elements included the specialist units and equipment needed to operate a single Air Port of Debarkation (APOD) and 2 Deployment Operating Bases (DOB).

SHORTFALLS

The shortfall in European (and also NATO) military capabilities for crisis management operations had been recognised, in general terms, well before the Brussels Conference. Indeed, the Defence Capabilities Initiative (DCI) launched at the 1999 NATO Washington Summit was designed specifically to bolster interoperability and to develop well-equipped and balanced forces that could deploy rapidly to meet a range of potential missions. The DCI called for improvements in 5 areas: deployability and mobility; sustainability and logistics; effective engagement; survivability of forces and infrastructure; and command and control. Some 58 separate initiatives were identified of which 5 tackled lift capabilities and 8 related to logistic shortfalls ranging from the development of multinational logistic formations through to improved co-operation in the acquisition and management of stocks. Experience from Bosnia

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and Kosovo has only served to confirm this analysis and reinforce the argument for change.[21] Although the DCI has delivered improvements, NATO intends to pursue further changes through the forthcoming Prague Capabilities Commitment.[22]

A WEU audit of assets and capabilities for European crisis management operations against illustrative mission profiles revealed a similar story. Although it was concluded that the Europeans, in principle, possessed the force levels and resources needed to prepare and implement military operations over the range of 'Petersberg tasks', a number of gaps and deficiencies were identified as well as areas where assets and capabilities needed to be strengthened. These included strategic intelligence and planning as well as force and operational capabilities. Aviation-related concerns included: the limited availability of strategic and tactical airlift; the scale of deployable airfield support required; the ability to sustain operational tempo (notably the number of tanker aircraft available); the limited capability for the suppression of enemy air defences (SEAD); and the lack of precision guided munitions (PGMs).[23]

The EU nations' progress in tackling these operational deficiencies was the subject of a 2-day Capabilities Improvement Conference held in Brussels on 19–20 November 2001. It was concluded that 5 of the 55 major shortcomings (against the 144 generic capabilities described in the HHC) identified at the Commitments Conference had now been solved while a further 10 were essentially remedied during the course of the conference. Shortfalls had been reduced to minor levels in 5 other areas and improved in a further 10.[24] Despite the optimistic language of the Conference there must be some concern that no progress was reported in any logistic-related areas, most notably strategic airlift.[25]

AVIATION LOGISTICS

'Aviation logistics' comprises all the varied activities that supply, move, store, sustain, maintain and repair the weapon systems, associated components and equipment employed by air forces. The complex nature of these activities, together with advanced technologies and extended supply chains, have produced a logistic environment comprising a matrix of interdependent, real-time processes linking industry with the frontline, operating at high tempo and involving large quantities of spares, consumable items and technical information. This complexity means that air power is built on what has been described as 'an inherent logistic frailty'.[26]

LOGISTICS DOCTRINE

Allied logistics doctrine has undergone a major transformation since the Cold War. Previously, logistics was a national responsibility aimed at providing a sustainable forward defence that would enable NATO to repel a massive attack in depth. Logistic preparations reflected this scenario: large stockpiles; a resilient supply system; provision for surge; and support arrangements with sufficient redundancy to continue to operate in an attritional environment. Logistic lines of communication were relatively short and well tested.

Under NATO's Strategic Concept, logistics was no longer a purely national activity but was to be focussed on supporting a range of contingency

The employment of the Apache attack helicopter as part of the UK's rapid reaction force has been described by one commentator as a 'possible logistic nightmare'

plans including out-of-area multinational operations. Nations and their respective NATO commanders had a collective responsibility for the logistic support of the forces involved.[27] Even so, nations still retained ultimate responsibility for ensuring adequate provision of logistic support for their units.[28]

EXPEDITIONARY AIR POWER

Supporting combat aircraft operations in the field remains the most complex of military logistic activities.[29] This is not an air force centric view; simply recognition that a weapon system capable of operating over long distances and at great speed, demanding substantial infrastructure and extensive support arrangements, with high consumption rates allied to ever increasing complexity and sophistication, presents a logistic challenge unmatched as yet by sea or land systems. Interestingly, the employment of the Apache attack helicopter as part of the UK's rapid reaction force has been described by one commentator as a *'possible logistic nightmare'*[30] – for the very same reasons that make supporting fixed wing aircraft in the field so difficult.

In short, the delivery of effective air power does not depend upon 'brute-force' logistics – rather it demands the close and timely integration of a wide range of supply and support activities stretching from the factory to the airfield. This is not to suggest that air forces have ever been particularly modest in their consumption of resources – as the size of their ground organisations and overall support budgets testify – but air power and logistics are intimately and inexorably linked, to a degree yet to be demonstrated by armies or navies.

OPERATIONAL LESSONS

Although the post Cold War military-strategic debate has highlighted the need for responsive, flexible and rapidly deployable forces, the reality has largely fallen short of the rhetoric. Few nations have engaged seriously in developing such capabilities and even fewer have been willing to be tested against the 'new paradigm'. The United States Air Force (USAF) and Royal Air Force (RAF) provide honourable exceptions but even they have found it a hard struggle to deliver the necessary capabilities.

The Gulf War revealed the immense scale of the logistic activities needed to support what was the largest contingency military deployment ever undertaken. During the 43 days of Desert Storm, the USAF flew over 34,000 combat sorties compared to some 46,000 transport sorties within the theatre of operations and 17,000 strategic lift missions. The harsh desert environment and accelerated training severely tested the provision of spares and consumables. The large distances involved, the new technologies deployed, the uncertainties of host nation support (HNS) and the complexity of multinational operations combined to make the logistic support of air operations extremely challenging. From the aviation logistics perspective, there were a number of important lessons to be drawn:

- The need for greater strategic airlift.
- The unsuitability of many weapon systems and associated ground equipment for deployed operations in unfamiliar environments.
- The poor air-portability of much equipment.

- The significant in-theatre resources needed to support air operations.
- The utility of deployable specialist aviation support units.
- The large effort required to outload munitions and to provide effective support in-theatre.
- The complexity of multinational logistics.
- The contribution of civilian (contractor) personnel to operational support.
- The importance of real-time asset tracking.
- The difficulties of in-theatre distribution.
- The need for accurate, comprehensive information and pre-planned deployment scenarios on which to base effective logistic planning.

Subsequent crises in Bosnia and Kosovo have confirmed the importance of these issues in supporting deployed air operations. The embarrassing delay in deploying a brigade of Apache attack helicopters from Germany to Albania, partly owing to logistic difficulties, merely highlighted that such problems can bite very hard.[31] Kosovo also demonstrated, once again, the overriding need to establish logistic arrangements that were efficient, integrated and flexible. From the European perspective, it also revealed how modest were their capabilities compared to the US.

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STRATEGIC AIRLIFT

EUROPEAN AIRLIFT CAPACITY

The European Air Group (EAG)[32] recently completed a study of European airlift capabilities and possible enhancements. It concluded that while there was a substantial European airlift fleet – at least in numerical terms (some 249 C-130/160 transport aircraft) – the majority were over 30 years old and there were competing demands on the same airframes for a wide range of roles. Although there were also 55 civil-type aircraft, of which 37 were cargo capable, no nation had the capability to move outsize military cargo, such as helicopters and main battle tanks.[33] Thus, while European air forces appeared to posses a significant cargo and passenger capability, almost every nation believed it had a significant shortfall in airlift capacity.[34] The 150 or so C-130 aircraft available to the European air forces would be very hard stretched to provide the number required each day by the SOPF scenario – even presuming there were no conflicting operational demands, serviceability and availability remained high, an adequate number of crews existed and some form of tasking co-ordination was available.

It can be safely concluded that the A400M programme will not make a major contribution to reducing the shortfall in European airlift capabilities much before 2012

Airlift co-ordination, between planning and tasking agencies, is fundamental to achieving effective strategic lift. Pending realisation of European procurement plans for additional airlift capacity, the EAG has sensibly proposed that measures be introduced to improve co-operation and co-ordination of existing airlift assets. This would embrace the recent Air Transport and Air Refuelling and other Exchanges of Services (ATARES) initiative and the introduction of a permanent co-ordination cell. ATARES has already proved a success in allowing European air forces to share existing transport and tanking capacity and so overcome

some shortfalls. The creation of a European Airlift Co-ordination Cell (EACC) should permit a more efficient and proactive approach to meeting military airlift needs. It is expected that an interim capability will be in place by March 2002 and full capability by May 2002.[35] Welcome as this development is, it would be helpful if the EACC's activities could be harmonised with the ACE Air-to-Air Refuelling Cell (AARCC), newly established alongside NATO's Reaction Forces Air (RFAir) Staff at Kalkar with the specific task of expanding AAR interoperability.

NEW PROGRAMMES

The planned acquisition of 196 A400M military transports by 8 partner nations promises to improve significantly the strategic lift available to support ERRF operations – albeit that the full number seems unlikely to be procured. Turkey has already reduced its requirement from 26 to 20 and there are suggestions that Germany might need to reduce its share from 73 to 55 aircraft.[36] The projected in-service date of 2007 has already slipped to 2009/2010 and further delays would not be exceptional for such a large and challenging programme. It can be safely concluded that the A400M programme will not make a major contribution to reducing the shortfall in European airlift capabilities much before 2012. When it does arrive, it will certainly overcome Europe's lack of general cargo capacity and go some way to meeting the ERRF's need for heavy/outsize lift.[37] In the meantime, the decision by the RAF to lease 4 C-17 transport aircraft has helped bridge the immediate gap in heavy/outsize lift but will not greatly reduce the overall shortfall in European strategic lift – even if additional C-17s are leased/purchased.

AIRLIFT MANAGEMENT

Procuring additional airlift is one matter; the management of these assets is another. Although there has been some speculation about the possibility of a European Air Transport Command, particularly in Germany, this seems to owe more to the simplistic view that joint procurement leads inexorably to joint management rather than careful analysis of the practicalities or the military value to be gained.[38] While the A400M programme is hugely important to Europe, in both investment and capability terms, it will not represent the entirety of European airlift. Moreover, there is an alternative model – in the form of the NATO E3 Sentry Force – that would permit national assets to be subordinated to a supranational operating agency with full command and control authority (as the UK and France have regularly and successfully demonstrated).

In the past, consideration has also been given to the adoption of the Civil Reserve Air Fleet (CRAF) strategy first employed by the USAF in the 1950s to enhance airlift capacity by funding on-call commercial capability. Although there are obvious attractions to such an approach, actual experience indicates that any gains are modest and fall far short of expectations. This is partly because of the difficulty of finding sufficiently attractive, but cost-effective, incentives for commercial participation and partly because of the competitive and dynamic nature of the market. The CRAF programme has become increasingly moribund and shows little sign of being given a new lease of life – notwithstanding the current US airlift shortfall.[39]

A significant obstacle to be overcome in rectifying the EU's shortfall in strategic airlift is the prioritisation, allocation and co-ordination of tasking. The EAG's proposals in this regard are timely, realistic and likely to prove effective in making better use of current and future EU air transport assets.[40] Even so, they do not pretend to provide for the efficient and simple management of airlift assets under operational conditions – as provided by NATO's Allied Movement Co-ordination Centre (AMCC) and subsidiary agencies. Although this question has yet to be resolved, there is no prima facie case for the creation of a European Airlift Command with its additional costs and bureaucracy. The key issue is how can

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European airlift assets be best managed to provide for the rapid deployment and effective sustainment of the ERRF? Employment of the AMCC with its established procedures, IT systems and broad experience would appear to provide a solution.[41]

WEAPONS AND EQUIPMENT

SUPPORT CHAIN INITIATIVES

European air forces have made gradual progress in improving supply and support chains in the decade since the Gulf War. However, the pace has been constrained by falling resources and a Cold War legacy in the form of weapon systems and support arrangements optimised for a short, intensive attritional struggle with the Warsaw Pact. Thus the Eurofighter – yet to enter service – has not been designed with deployed operations in mind. The scale and size of the ground support equipment required for day-to-day operations militates against a small deployment footprint or ready transportability. Even so, considerable effort is underway to transform legacy support chains. The outsourcing of support and the involvement of contractors in logistic activities are being increasingly employed to achieve greater efficiencies in delivering military capability for many European air forces.[42] Nevertheless, substantial reductions in the cost of ownership can only be achieved if these aspects are

studied early in the procurement of new weapons systems. This is increasingly the focus of work, often in partnership with the contractor(s) – a trend aided by the ongoing rationalisation and integration across the European defence-manufacturing base.

SUSTAINABILITY

Logistics sustainability aims at providing effective support for the duration of a deployment. The arrangements put in place need to cope with extended crisis management operations, redeployment in-theatre, the roulement of personnel and aircraft and variations in operational tempo. Expeditionary warfare also largely denies the ability to pre-plan or pre-position. The units making up the ERRF air contingent must, therefore, be largely self-sufficient – at least in the early stages of an operation.
A balance has to be struck, however, between cost and risk. Few if any air forces can afford to move large quantities of spares into theatre against possible arisings. Whereas during the Cold War the RAF relied upon flyaway packs (FAPs) capable of sustaining squadron operations for up to 30 days, these needs are now met by priming equipment packs (PEPs) intended to support individual squadrons for up to 10 days. While this strategy saves considerable expense, it does rely upon a more responsive supply chain, reduced pipeline times and the provision of in-theatre facilities to assist faultfinding and the more rapid turn round of some components.[43]

An RAF Tornado squadron requires upwards of 400 personnel in-theatre, of which probably no more than 150 are engaged in direct maintenance activities

DEPLOYED OPERATING BASES

Deployed Operating Bases (DOBs) require a wide range of supporting units in order to function. The essential airfield capabilities (including operations, air traffic, fire and crash, air defence, security, etc) need to be matched by both specialist and general engineering elements. The RAF has grouped these into air combat support units comprising mobile engineering support, explosive ordnance disposal, transport, fuels, logistics and supply, communications and information systems, air movements, administration, tactical medical, catering and hangar erection. Regular deployments and wide operational experience, including the development of an extensive range of deployable component test and repair facilities, portable fuels equipment, hangarage, shelters and tentage have raised these units to a high degree of professionalism and efficiency – well able to cope with the challenges of deployed air operations.[44]

DEPLOYMENT FOOTPRINT

None of the combat aircraft currently represented in European air force inventories, with the possible exception of the Harrier, were designed with deployed operations in mind. As a result, the deployment footprint (the number of maintenance personnel and quantity of ground equipment and support facilities) is relatively large. For example, an RAF Tornado squadron requires upwards of 400 personnel in-theatre, of which probably no more than 150 are engaged in direct maintenance activities. If this total can be reduced, not only does it place less pressure on already hard pressed airlift assets but it also reduces the roulement burden. Unfortunately, while aircraft designed to operate under Cold War conditions remain in the European inventory, the scope for significant improvement is necessarily constrained. Indeed, the airlift required to deploy a Eurofighter squadron may yet prove to be greater than for a Tornado squadron.[45]

The USAF has also made strenuous efforts in recent years to reduce the size of the deployment footprint. By focussing on improvements in the speed and responsiveness of the supply chain it has proved possible to reduce stocks and the range of engineering and support activities undertaken in-theatre as well as the number of personnel deployed forward. This does, however, inevitably increase the reliance on pipeline performance. As ever a balance has to be struck between risk and efficiency; between redundancy and resilience.

Although European air forces have introduced similar initiatives (under the 'express chain management' and 'lean support' labels in the UK) the fragmented nature of the European aviation support chain further restricts the efficiencies that can be realised. Some reductions can certainly be achieved by sharing specialist aviation resources as well as by creating joint multinational logistic units. On balance, however, it is to future weapon systems that one should look for substantial reduction in the level of logistic support demanded by deployed operations.

SURVIVABILITY

Aviation logistics is, as already noted, an inherently fragile activity. Protecting deployed air assets and safeguarding the supply chain presents an ever-increasing challenge. In this context, survivability embraces both passive and active defence – including air defence measures. As greater reliance is placed on the efficiency and speed of the pipeline to sustain air operations and minimise the

deployment footprint, so vulnerability to interdiction grows. This can arise through either military or political action (such as the closure of NATO's supply lines to Kosovo by Macedonian nationalists).[46] The increasing employment of contractors introduces new uncertainties and additional vulnerabilities. Moreover, while the drift towards greater multinational co-operation and the shared employment of assets provides an opportunity to enhance resilience, it also introduces the possibility that a key element in the supply chain may be outwith the coalition partners. Thus, the level and degree of multinationality of the supply chain will have to be balanced against both effectiveness and vulnerability.

STANDARDISATION

NATO has pursued the goal of standardisation for many years. This has included efforts to improve compatibility, commonality and interchangeability in both the operational and logistic fields. The underlying aim has been the enhancement of interoperability – and hence military capability. The NATO Defence Planning Process together with the Planning and Review Process have been key drivers in this respect for both Allied and EU force development. Amongst air forces, the main focus has been on the standardisation of equipment, connectors and supporting systems for refuelling systems, weapons handling, drop tanks and towing of ground equipment.[47] Progress beyond such relatively undemanding areas was limited by the doctrine of national logistic responsibility.

Both the RFAir Staff and the EAG have sought to develop further standardisation and improve interoperability – with some success. Nevertheless, if European military aircraft are to operate successfully together on deployed operations a great deal more needs to be done. A focussed approach is required with an agreed programme of work and specific targets for interoperability (or 'mutualisation' as it is sometimes described). This should look beyond the cross-servicing capabilities and examine how commonality might be improved, ground equipment shared and specialist aviation support units employed more efficiently – with the specific aim of delivering greater military output. The creation of multinational force packages, operating from common DOBs, would provide a further incentive for change. The joint logistic arrangements that exist for the Dutch and Belgian air force F-16 fleets and the extensive system of co-operative support between the various Nordic air forces indicate what might be achieved.[48]

TRAINING

Many of the air forces providing units or personnel to the ERRF may never have been involved in expeditionary warfare or deployed operations. Even experienced air forces, comfortable with operating from austere bases and confident in their logistic arrangements, find it essential to train regularly through exercises, squadron exchanges and routine overseas deployments. There are also cultural and psychological barriers to be overcome in operating complex aircraft away from the well-prepared and familiar home base. These problems can only be overcome by a comprehensive and sustained training programme that develops skills, experience and confidence amongst individual units and between allies.

No deployed operation matches previous experience or the contingency plans – however exhaustive. The inherent frailty of aviation logistics coupled with the near certainty that significant air power will be required from the earliest stages of an operation, necessitate the development of flexible, efficient and responsive logistic arrangements. Realistic deployment training and regular exercises are essential if these aims are to be realised.

MUNITIONS

The support of munitions is the Cinderella of deployed operations – on both sides of the Atlantic. This is partly because it is the area where there is the least practice – outloading and handling munitions provide significant physical difficulties – and partly because of an historic preference for focussing on weapons platforms rather than weapons. The increasing utilisation of PGMs has to some extent disguised the problem by creating an expectation that large quantities of iron bombs will no longer need to be shipped to forward operating bases.[49] While it is certainly true that the proportion of smart weapons employed in recent operations has steadily grown, the overall quantity of ordnance remains substantial as the table below indicates). Indeed, the range and variety of armaments employed during an air campaign make the movement and handling of munitions a highly challenging activity requiring ever-greater specialist support.[50]

UK Air Munitions Consumption – Operations 1982/1999

	Operational Sorties	Attack Sorties	Freefall (Qty)	LGB (Qty)	% Smart
Falklands	2,347	215	251	11	4.4
Gulf	5,417	2,146	6,075	1,117	18.4
Kosovo	1,618	1,008	1,005	244	24.3

The option of pre-positioning equipment and stocks, as in the Cold War, is no longer a realistic strategy – not least for reasons of affordability. It would be sensible, therefore, for European air forces to seek more efficient ways to employ existing weapons stocks and specialist armament support systems.

MULTINATIONAL LOGISTICS

Multinational endeavours in any field create distinctly different challenges – if only because of the political, historical and cultural barriers to be overcome or accommodated.[51] Not surprisingly, progress in developing effective multinational logistic arrangements has been slow, notwithstanding NATO's encouragement of multinational co-operative measures such as lead nation (LN), role specialist nation (RSN) and multinational integrated logistic units (MILUs).[52] The key enabler in assisting and promoting these concepts is the multinational joint logistic centre (MJLC) – in effect, the logistic arm of the CJTF. Some success has been achieved but generally in the non-specialist support areas such as transport, port activities, reception and staging, policing and fuel distribution. A recent study has indicated that manpower and equipment savings of between 9% and 45% can be achieved through the establishment of such joint logistic operations.[53] Thus, although the impact on aviation support has to date been limited, there is every reason to explore the wider employment of MILUs across the entire logistic spectrum.

ERRF JOINT LOGISTICS

There is clear potential for the introduction of the MJLC concept in the provision of logistic support to the ERRF. A 'European' MJLC could play an important role in the operation of the ports of debarkation (APODs and SPODs) as well as the efficient allocation of HNS. At present, any extant in-theatre facilities or resources tend to gravitate to units and nations on a 'first come first served' basis. There is also an increasing demand for the allocation and co-ordination of support contracts and the management of contractors employed on deployed operations. Finally, some form of high-level oversight is needed to exploit properly the opportunity for co-operative logistic arrangements across the range of specialist aviation support activities. In short, the creation of a 'European' MJLC would enable the NATO joint logistics doctrine to be further developed to the advantage of the ERRF.

CONTRACTOR SUPPORT

The employment of contractors for battlefield support is not a recent concept but it has been given new impetus as part of ongoing initiatives to reduce logistic support costs. So far no clear consensus has emerged on the appropriate activities for contractors and the risks involved.[54] Attitudes vary across European air forces as to the level of support that should be retained in-house (to provide for surge, reinforcement, benchmarking, monopoly reduction, obsolescence management and intelligent customer capabilities) and what can be profitably and sensibly outsourced without reducing operational capabilities. For example, the national support strategies for the Eurofighter – beyond the initial period of contractor logistic support – vary greatly with some air forces intent on retaining as many support activities as possible in-house and others seeking the greatest possible involvement of contractors. The result is a confusing tapestry of support strategies across the European air forces, varying from weapon system to weapon system and within individual projects, some mature but many groundbreaking.

ASSET TRACKING AND DISTRIBUTION

The efficient management of spares and equipment on deployed operations rests on IT systems to track and distribute in-theatre stocks and to expedite re-supply. The RAF has developed deployable engineering and supply systems to meet these needs, although individual item tracking is still an aspiration. Considerable effort has been expended over many years by air forces to improve the control of equipment and spares. Progress has been slow for a variety of reasons but it has to be said that even the commercial marketplace has yet to establish a worldwide standard for parts traceability across the entire supply chain, albeit that efforts are underway to solve the problem.[55] The NATO Asset-tracking Information Routing Network (NAIRN) project aims to provide a viable and effective information system for tracking critical assets. In the meantime, short-term improvements in asset tracking are likely to rest with the various national programmes.[56]

The difficulty of managing assets in-theatre should not be underestimated. At times during the Gulf War it was found easier and quicker to despatch replacement equipment and spares to the deployed RAF squadrons rather than to track down the items that were known to be in-theatre already but lost somewhere in the pipeline or safely out of reach amongst the hundreds of thousands of items held at the ports or airheads. These problems are unlikely to get any easier with the passage of time.[57]

LOGISTIC PLANNING

The need to deploy air power quickly and effectively has significant implications for the logistic planning process at both the operational and strategic level. Rapid response times require a balance to be found between the amount of support to be deployed, the HNS available, the responsiveness of the supply pipeline and the speed at which in-theatre logistic arrangements can be set up. The challenge of logistic planning is to confront these issues for both the current operational environment and across the longer-term where there is an opportunity to implement alternative support strategies. Indeed, it has already been suggested that the RFAir should rethink its entire combat support system, using the analytical framework developed for the USAF's Agile Combat Support initiative, to provide the strategic context in which to study deployment metrics such as: logistic footprint and bed-down time.

EUROPEAN LOGISTICS DOCTRINE

The varied initiatives currently underway to improve standardisation and interoperability of European air assets are to be applauded. The more that differences in equipment and logistic processes are eroded the greater the potential operational benefit. But, these improvements are modest compared to what could be achieved if individual national air components were able to function on a co-operative basis across the entire operational spectrum.[58] This can only come about if there is a common vision of what is to be achieved and a shared logistics doctrine.

NATO has already provided an air logistic doctrine that tackles the requirements for deployed operations. Given that this meets the needs of many EU air forces and has been built around the principles of joint, co-operative logistics, there would be considerable utility in using this as the basis for ERRF planning.[59] At a practical level there remains a need to create a successor to the WEU Logistics Group (WELG) that sought to enhance logistic interoperability and achieve more effective support for military operations. Without such a forum, it is difficult to see how the efforts of individual nations can be harnessed to the task of improving European military capabilities.

There is also a need to provide a clear statement on future aviation support arrangements that will inform and guide acquisition programmes – managed by OCCAR, the Western European Armaments Group or national procurement agencies – and help reshape support strategies for legacy systems.

PLANNING TOOLS

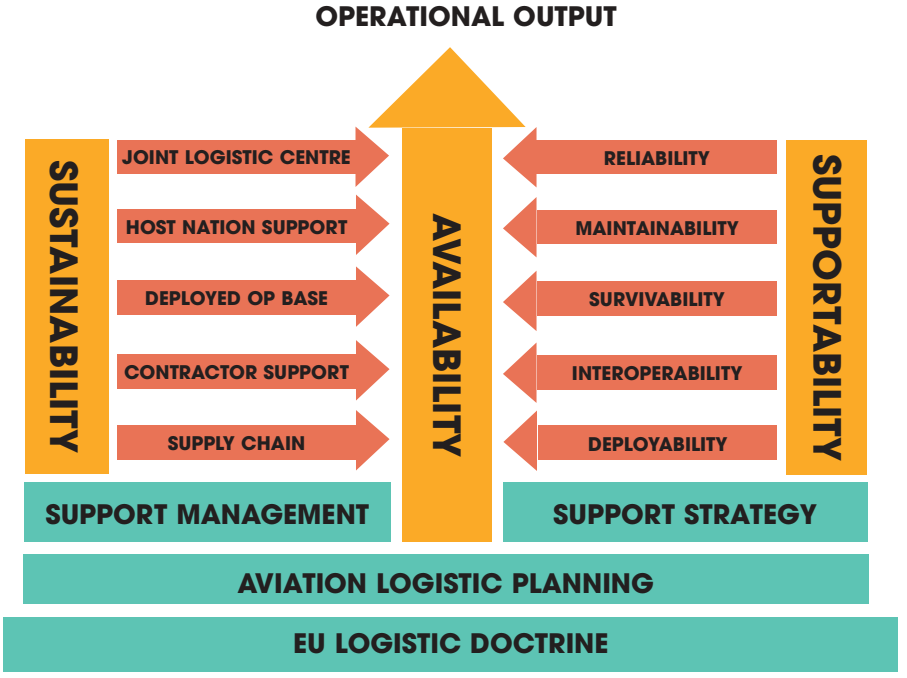
The planning of deployed operations can prove to be a complex and time-consuming process embracing both conferences and negotiations – threatening any semblance of rapid response. To avoid some of these difficulties, NATO has a variety of generic logistic planning tools in place or under development.[60] The RFAir Staff has developed a modular deployment planning process, allied to the creation of an extensive database incorporating HNS capabilities and ACE-wide deployment-related data, to speed decision making.

A comprehensive and well-tested deployment planning process is critical to achieving acceptable activation and deployment timescales as well as to reducing the subsequent bed-down period. It also opens the way for contributing nations to focus on effective force inputs, the identification of logistic shortfalls and potential duplication as early as possible and, when linked to the movements planning process, the efficient utilisation of lift assets.

DELIVERING EXPEDITIONARY AIR POWER

One might be forgiven for concluding, from this brief survey of the logistic problems confronting European air forces that there are no realistic prospects for success. But, air power has always been built on an inherent logistic frailty and, although supporting complex weapon systems engaged in expeditionary warfare is hugely challenging, the collective resources available to the EU are more than adequate to the task.

LOGISTIC DRIVERS – EXPEDITIONARY AIR POWER



Military capability is the product of complex decisions, involving political, environmental, technical and resource considerations, taken over many years. Deployed, multinational air operations add further levels of complexity. There are, however, some fundamental drivers that apply equally to air power as to other forms of military output. All of the logistic issues explored earlier contribute to aircraft availability and hence to operational capability. These elements can be broadly grouped into either support management (processes) or support strategy (environment) – as indicated in the attached schematic. Support management focuses on real time activities that directly influence sustainability. For deployed air operations, these are the responsibility of the logistic organisation within the theatre of operations (such as the DOB and HNS) and the enabling supply chain. Support strategy, on the other hand, aims to shape the logistic environment by, for example, examining the supportability of new equipment through design and of legacy systems through improvements in reliability and maintainability.

The provision of effective logistic arrangements for the aviation element of the ERRF depends on both support strategy and support management. These activities are largely interdependent but operate to

different timelines. The aim should be to blend strategy and management into a single holistic support activity through careful logistic planning that balances availability, supportability and sustainability to deliver cost-effective military output. The temptation, however, is to focus on sustainability since improvements in support management can be achieved relatively quickly and shortfalls in supportability can be abated (at least temporarily) by providing greater resources. On the other hand, improving the supportability of legacy equipments is a time-consuming process that may threaten longstanding national arrangements. If the ERRF is to provide the sustained flexible expeditionary capability envisaged, it is essential that a comprehensive and balanced joint logistic doctrine is developed to underpin the planning process.

There are several logistic weaknesses that restrict the current ability of European air forces to contribute effectively to the ERRF

CONCLUSIONS

The establishment of an effective ERRF presents the European nations with an immense challenge. The creation of the Helsinki Headline Goal has provided a spur to the necessary transformation and thrown into sharp relief Europe's limited capabilities to mount deployed operations without the support of US forces. Although much has been made of the Helsinki Force Catalogue, it cannot be regarded as the 'end of the beginning', let alone the 'beginning of the end'. There is a significant amount of work remaining before the ERRF can be declared fully operational.

The dominant role of air power in facilitating and sustaining deployed operations has been readily apparent over the past 10 years in successive crises in the Gulf, the Balkans and most recently in Afghanistan. However, air power is built on extensive and expensive logistic provision that requires careful management and the deployment into theatre of large numbers of personnel and considerable quantities of equipment. There are several logistic weaknesses that restrict the current ability of European air forces to contribute effectively to the ERRF. These include: the lack of strategic lift; unsuitable weapons and equipment; the high cost of deployed support; inadequate provision for munitions; limited co-operative logistic arrangements; fragmented employment of contractor support; poor asset tracking; and little, if any, integrated logistic planning.

Improving European airlift capabilities is clearly essential to providing the ERRF with the necessary deployability. Rapid reaction is fundamental to the ERRF's success – in as much as it is feasible to separate this from the political decision making process. Without the ability to deploy quickly (given the requisite availability and mobility of the force elements) the ERRF would be incapable of participating in the full range of 'Petersberg tasks'. Even where an incremental strategy is employed – that requires force to be applied in a graduated manner (as occurred in Kosovo) – speed of response will still be critical. The current European initiatives to improve airlift capabilities (in the form of the A400M and C-17 programmes) are to be welcomed. But, it is equally important that agreement is reached on how such assets are to be managed from the planning and tasking perspectives.

At present, individual European air forces are pursuing distinct and varied support strategies that provide for limited coherence across the EU as a whole. Admittedly, there is a reasonable expectation

that integrated support solutions can be introduced for new weapon systems procured as joint programmes, through OCCAR. By confronting these aspects early in the programme there is every chance that efficient and cost-effective logistic arrangements can be found that will provide better support for deployed operations. However, there is no escaping the problems presented by the legacy weapon systems that will remain in service for a considerable time to come. For the moment, the focus is likely to remain on improving existing national support arrangements, and thus the early delivery of a holistic approach to logistic support for the ERRF is most unlikely.

In the ongoing efforts to achieve practical improvements in the support of existing aircraft there is a real danger of 'too many cooks'. Both the EAG and the RFAir Staff are pursuing commendable initiatives to enhance interoperability and improve logistic efficiency by solving many of the problems identified above. There is, nevertheless, a clear need to co-ordinate such efforts. This role should properly fall to the EU member states – exercised through the EUMS in its secretariat role – with the demise of the WEU and the work of its various working groups, such as the WELG. However, there is a much more important role for the EUMS beyond simply filling the post-WEU vacuum. The European air forces urgently need clear guidance on logistic doctrine, processes, procedures and the role of contractors to help determine national and collaborative support strategies.

It may be that the time is now right to overcome one of the remaining barriers to a cost-effective and efficient European aviation support chain – the requirement for 'juste retour'. This continues to distort competition and detract from finding the best commercial solution to meeting long-term support needs.[61] The recent announcement by the Belgian government that they no longer plan to link military procurement spending to industrial offset agreements may prove to be a catalyst for further 'deregulation' of the market and increased competition in the support arena.[62]

Inasmuch as US military capabilities remain a benchmark for other nations, it is vital for the success of future multinational operations, and for the credibility of the Alliance, that the European members of NATO are able to operate effectively alongside their US partners. EUMS-inspired efforts to improve European interoperability would provide the opportunity both to enhance ERRF capabilities and to reduce the US/Europe capability gap. Moreover, beyond this lies the prospect of ameliorating a further technology gap, that between NATO and non-NATO European nations. However, unless the ERRF continues to develop around existing NATO doctrine and planning processes it is likely that the gap (s) will widen rather than reduce.

Perhaps the greatest challenge to achieving any significant improvement in European military capability is the question of resources and the apparently remorseless fall in European defence budgets. There have already been warnings that unless the situation is reversed it will be difficult to create the self-sustaining force that the EU has pledged.[63] But, it is equally true that the combined defence budgets of the EU nations could provide much greater military output. The restructuring of European defence industries may well help this process. It is also true that by facilitating greater co-operative support efforts and the sharing of specialist skills and equipment, the high costs of logistic support can be reduced while enhancing military output. An important step in this direction would be the creation of dedicated European multinational logistic support units and the provision of joint specialist air combat support. This capability could be further enhanced through a programme of regular deployments and joint exercises.

The final hurdle to be overcome, but in many ways the most important, is the provision of an integrated operational planning staff to deliver effective, flexible and efficient logistic support in the field. Common sense suggests that the ERRF should draw on existing NATO capabilities and resources to meet these needs. There is no rational excuse for developing a separate, parallel organisation to serve this purpose – it is neither affordable nor practicable. Just as importantly, pursuing such a path would likely serve to

increase the differences between individual air forces and further weaken interoperability and standardisation.

So far, progress in creating an effective ERRF can be likened to providing a model kit with the requisite parts. They are largely all there but with some duplication. Construction awaits detailed instructions on how the individual pieces are to be assembled and what the finished product is to be. In other words, without the necessary doctrine, and an agreed planning process, construction of the ERRF cannot begin. It little helps that the box art provides a dramatic visualisation of the finished product, other than to the potential purchaser – the hard work lies within. Failure to tackle these issues will not only delay achievement of the Headline Goal but also ensure, as Romano Prodi admitted in the aftermath of 11 September, that the EU remains *'powerless in the united and global war'*.[64]

Notes

1 While the term European Rapid Reaction Force is commonly used in the media, it is not formally recognised by the EU. Nevertheless, for convenience and to avoid confusion, the term is employed in this article. This should not be understood as implying that a standing force has been created or, indeed, is proposed.
2 Daily Telegraph, 12 & 13 June 2001.
3 Daily Telegraph, 18 May 2001.
4 Strategic Survey 2000/2001, International Institute for Strategic Studies, 2001.
5 Including the Secretary of State for Defence, Geoff Hoon, interviewed in The Financial Times, 16 November 2001 and Lord Robertson, ESDI and Transatlantic Defence Co-operation, Chatham House, 29 January 2001.
6 William Cohen, New York Times, 22 September 1999. See also, Heisbourg, Emerging European Power Projection Capabilities, Joint RAND and GCSP Workshop, Geneva 15-16 July 1999, available at www.gcsp.ch.
7 Strategic Survey 2000/20001, Op cit.
8 The other 'pillars' being Community (1st) and Co-operation on Justice and Home Affairs (3rd).
9 Meeting in June 1992 at Petersberg, Germany, WEU members declared their preparedness to make available units from the whole spectrum of their conventional armed forces for a variety of missions outside common defence. These 'Petersberg tasks' were defined as:
   -- Humanitarian and rescue tasks.
   -- Peacekeeping tasks.
   -- Tasks of combat forces in crisis management, including peacemaking.
10 Financial Times, 30 April 2001. Belgium's Foreign Minister subsequently stated that the ERRF had achieved 'limited operationability' at the Laeken Summit held in December 2001.
11 The EUMS, formally established as a permanent body on 11 June 2001, comprises 135 staff drawn from all the EU nations.
12 These included, for example, that: the Headline Goal was to be met if possible by June 2003 and December 2003 at the latest; the most demanding missions would occur in and around Europe; and that provision should be made for concurrent operations - defined as the ability to conduct a single corps-sized crisis management task while retaining a limited capability to conduct a small-scale operation.
13 These steps are described in detail within the 'Food For Thought' document endorsed by the interim PSC on 14 March 2001 – available at ue.eu.int/news.
14 For a description of the role of the EUMS see Messervy-Whiting, The European Union's Nascent Military Staff, RUSI Journal, December 2000.
15 Defence Ministers Meeting, Ecouen, 22 September 2000 – available at ww.weu.int/assembly/eng/reports.
16 The combat elements, to be drawn from a force pool of 400 aircraft, included: Air Defence; Air Interdiction; Suppression of Enemy Air Defences; and Tactical Recce. The support aircraft force elements include: Air-to-Air Refuelling; Airborne Warning and Control; Strategic Recce, Combat Search and Rescue, Medevac; and Tactical Transport. Nice European Council Presidency Conclusions - available at www.ue.eu.int/pesc/Military.
17 The USAF deployed some 1,223 aircraft and over 44,000 support personnel in theatre compared to the RAF's 147 aircraft and over 6,000 personnel. Royal Air Force Air Power Review Spring 1999, page 85.
18 Calculated on the basis of 25 C-130 sorties to deploy a 12 aircraft squadron. This is probably a conservative estimate. For example, the deployment of a German ECR Tornado squadron requires the movement of 1,000 tons of equipment and supplies as well as 800 personnel. Schmitz and Rausch, Operational Logistics in NATO, Air Force Journal of Logistics, Vol XXIV, No 1, Spring 2000.
19 Defence Policy 2001 – available at www.mod.uk/index.
20 NATO Assembly Report AT-247-DSC-00-7, Building European Defence, Nov 00.
21 Aviation Week & Space Technology, 17 May 1999, pages 31-33.
22 Aviation Week & Space Technology, 11 November 2002, page 62.
23 Audit of Assets and Capabilities for European Crisis Management Operations Recommendations for Strengthening European Capabilities for Crisis Management Operations, WEU Council of Ministers, Luxembourg, 23 November 1999. Available at www.weu.int/eng/mini/99luxembourg/recommendations.
24 Progress and shortfalls against the HHC were presented in the form of a Helsinki Progress Catalogue.
25 Jane's Defence Weekly, 12 December 2001. However, on the positive side, it should be said that a number of NATO DCI-related logistic initiatives are likely to benefit the ERRF.

26 NATO, Air Forces Logistic Doctrine and Procedures, ALP-4.3 (ALP-13), October 2000.
27 Principles and Policies for Logistics, NATO MC 319/1.
28 Air Forces Logistic Doctrine and Procedures, NATO ALP-4.3 (ALP-13), October 2000.
29 NATO's Air Forces Logistic Doctrine and Procedures, ALP-4.3 (ALP-13), describes the characteristics of aviation logistics and observes that, across the spectrum of difficulties, fixed wing aircraft are to be found at the most difficult end.
30 Living Logistic-Loca, Gary Stretton, Defence Review, pages 33-34, Summer 2001.
31 Airport congestion at Rinas initially prevented the task force's considerable logistic support equipment and supporting helicopters – including 8 Chinook and 24 Blackhawk helicopter transports–from being deployed in a timely fashion. Ultimately, a combination of factors, including the austere facilities available in Albania, denied the Apache brigade an operational role. Ripley, Conflict In The Balkans, Osprey Aviation, 2001.
32 The EAG was inaugurated in September 1995 as a Franco-British organisation tasked with improving operational capabilities primarily through enhancements in interoperability. Currently 7 European nations are members.
33 This report, of course, predated the lease of C-17 aircraft by the UK. It is also questionable as to whether there is military utility in moving MBTs by air.
34 EAG, European Airlift Study, December 2000.
35 Aviation Week & Space Technology, 9 July 2001, pages 41-42.
36 Aviation Week & Space Technology, 4 June 2001, page 17. The number may fall yet further under budgetary pressure.
37 The A400M is limited in its ability to transport the heaviest Main Battle Tanks – such as the Challenger - or the larger support helicopters without some disassembly of rotor heads, etc.
38 Sunday Telegraph, 22 April 2001.
39 Palmby, Enhancement of the Civilian Reserve Air Fleet: An Alternative for Bridging the Airlift Gap, Air University, June 1995.
40 Once again, NATO work stemming from the DCI, to achieve greater logistic co-operation (DM2) and assured access (DM5), may be of benefit to the ERRF.
41 Notably, the Allied Deployment and Movement System (ADAMS).
42 See, Military Aviation Maintenance Support Strategies, Air Force Journal of Logistics, Vol XXV, No 1, Spring 2001.
43 It was calculated in 1992 that the continued policy of providing FAPs for the RAF's Tornado, Harrier, Jaguar and Puma fleets would cost £230 million compared to £125 million for the equivalents PEPs. For the Eurofighter – for which spares provisioning had yet to occur - the PEP was expected to cost some £97 million compared to £222 million for a FAP. Mobility and Deployed Support Study, MOD, 1992.
44 Additional specialist support units include: aircraft battle damage repair; tactical supply; and airfield infrastructure construction and repair provided by the Royal Engineers.
45 For example, 2-3 Hercules equivalent loads are required just to deploy the ground-based IT support systems for the Eurofighter. On the other hand, the introduction of multiskilling amongst the ground support trades may yet reduce the deployment footprint.
46 The Daily Telegraph, 2 August 2001.
47 The NATO common procurement programmes of the 1960s, such as the FIAT G91, saw very little development of common support arrangements other than a limited role for NAMSA.
48 Other important initiatives include the Nordic helicopter programme, the Nordic Co-ordinated Arrangement for Military Peace Support and a range of Baltic multinational projects.
49 The carriage life of PGMs is relatively short (it can be under 20 hours) and thus 'consumption' may prove to be higher than operational utilisation rates indicate.
50 For a detailed analysis of the issues involved, from the USAF perspective, see Underwood & Bell, AEF Munitions Availability, Air Force Journal of Logistics, Vol XXIII No 4, Winter 1999 and Abell et al, Alternate Munitions Prepositioning, Air Force Journal of Logistics Vol XXIV No 2, Summer 2000.
51 See, Gorman, Multinational Logistics – Managing Diversity, Air Force Journal of Logistics Vol XXIV No 3, Fall 2000
52 Progress is likely to remain slow until the direction is clearer and an agreed doctrine emerges.
53 A Cost Benefit Analysis Study Of NATO Multinational Logistics In The Balkans, LR 010/SX Dated 25 May 2001.
54 The DLO has provided guidelines for the employment of Contractors on Deployed Operations (CONDO) by the UK Armed Forces but there is no similar document describing common principles amongst the European nations.
55 Using the Air Transport Association's SPEC 2000 permanent bar code ID standard.
56 The DLO is developing a single codified inventory under the Defence Stores Management System (DSMS) programme that will provide for selected serial number tracking of items.
57 Robert Tripp, A Framework for Evolving Agile Combat Support Concepts to Meet NATO RFAir Operational Requirements, RFAir Conference December 2000.
58 This is not to argue, however, for role specialisation.
59 Significantly, the EU has agreed that it only create doctrine if no other exists.
60 These include Logistics Reporting (LOGREP), Logistics Database (LOGBASE) and Logistics Functional Area SubSystem (LOGFASS). Logistics Topics In A Small Air Force, Air Warfare Centre Logistics Seminar, Madrid, 1999.
61 The OCCAR Convention, House of Commons Defence Committee, First Report, Session 1999-2000, 25 November 1999.
62 Aviation Week & Space Technology, 2 July 2001, page 21.
63 International Institute for Strategic Studies, Strategic Survey 200/2001.
64 Financial Times, 16 November 2001.