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To cite this article: Björn Hagelin (2012) Into the black box? Technology sharing in major arms transfers and beyond, *Defense & Security Analysis*, 28:2, 163-175, DOI: [10.1080/14751798.2012.678146](https://doi.org/10.1080/14751798.2012.678146)

To link to this article: <https://doi.org/10.1080/14751798.2012.678146>



Published online: 11 May 2012.



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Into the black box? Technology sharing in major arms transfers and beyond

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From the recipients' perspective, arms transfers have, through the use of offsets, technology transfers, and industrial participation, become an opportunity to receive not only advanced weapons, but also technologies not otherwise available. How important are friendly relations for securing a military export order? To what extent do buyers demand advanced military or commercial technology and how are these demands accepted by the supplier? How does this influence smaller producers in relation to major producers? These questions are addressed by studying (a) the Joint Strike Fighter/F-35 by Lockheed Martin, USA, and the JAS-39 Gripen aircraft by Saab, Sweden, (b) the Medium Multi-Role Combat Aircraft competition in India for 126 combat aircraft, and (c) the Indian offset policy. In the final section, some long-term consequences are discussed.

Keywords: France; India; Sweden; USA; EU; UN; Eurofighter; F-16; F-18; F-35; JAS-39 Gripen; MiG-35; Rafale; MMRCAs; arms trade; arms control; cooperation; industrial participation; offset policy; source code; technology transfer

Introduction

This article analyses international technology transfers in connection with two major weapon developments and sales: the Joint Strike Fighter (JSF)/F-35 designed by Lockheed Martin (LM), USA; and the JAS-39 Gripen aircraft by Saab, Sweden. Technology in the form of skills or goods is an asset to be traded or protected by research institutions, commercial firms, and governments.¹ Technology may be used as a political tool to show appreciation or apprehension of the policies or behaviour of others. This is reflected in the acceptance or rejection of transferring modern major weapons and their related technologies to foreign governments. Such transfers may thus be regarded as indicators of friend or foe.

How important are friendly relations for securing a military export order? From the recipients' perspective, arms transfers have, through the use of offsets, technology transfers, and industrial participation, become an opportunity to receive not only advanced weapons, but also technologies not otherwise available. To what extent do military buyers/importers demand advanced military or commercial technology and how are these demands accepted by the seller/supplier/exporter? How does this influence smaller producers in relation to major producers? These questions are addressed by studying the two aircraft projects mentioned above, the competition in India for an order of 126 combat aircraft, and the Indian military offset policy. In the final section, the issues raised are discussed in a longer term perspective.

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Aircraft and technology

The fourth generation JAS-39 C/D is operational both in Sweden and abroad.² Its design is older than that of the fifth generation F-35 and Saab has only produced a test version of a new JAS-39 E/F aircraft (also named as Next Generation (NG) or Super JAS). No political decision has yet been made as to the future of the JAS-39 NG.³ Should, however, Saab manage to get a foreign order that includes this version, preferably through shared development costs, a Swedish government order of perhaps 10 aircraft is likely. This procedure, based on economic realities, goes contrary to the traditional argument that military exports are basically impossible if one's own government has not ordered the product. Exports with co-development are, therefore, important for Saab. One such arrangement is on offer to Brazil while a Swiss acquisition of the Gripen is uncertain.

Major export deals today include technology transfers. Most recently, Saab competed for a major Indian order with a special Indian (IN) JAS-39 C/D configuration. The offer may be defined as bilateral, one-and-a-half way co-operation, compared to the international and two-way F-35 programme. While Saab offered technology transfers from Sweden as well as the involvement of Indian industry, technology transfers to Saab and the Swedish JAS-39 programme were not part of the arrangement. An order for the co-development of the JAS-39 NG version, however, will be more of a two-way undertaking. One difference with the F-35 programme, however, is that JAS-39 NG co-development will be bilateral whereas the F-35 programme was international from the start, with technology transfers from US producers to partner countries as well as to US producers from industries in the partner countries.

US arguments for involving foreign partners in the F-35 programme were, apart from a potential production run of around 3000 aircraft: improved interoperability with allied forces; access to the best foreign technology; reduced programme costs; and expanded foreign relations. The goal of interoperability clearly points to a specific group of friends (i.e. allies) rather than foreign buyers in general, although the aircraft will be exported also to other than partner governments. By becoming a partner in either the Concept Demonstration Phase (CDP) or the Systems Development and Demonstration (SDD) Phase from 2002, foreign governments paid the price for being able to influence the aircraft requirements, establish industrial relations with US suppliers, access aircraft data, as well as receive waivers on costs and potential sales.⁴

The foreign technology accepted into the F-35 design is described as the best because it is, formally, only accepted on a competitive basis. By international competition (best value), instead of foreign participation in relation to the partners' financial contributions (*juste retour*), LM hoped to reduce programme costs. However, technical and other problems have increased the price and pushed the F-35 delivery date from 2012 to around 2016.⁵ As a result, the final price is unknown, as well as the number of aircraft that will eventually be bought both in the USA and abroad as production problems, delays, and higher cost may well reduce continued interest in the programme.⁶ The price and concerns voiced in several countries,⁷ not least in Canada, increased during 2011.⁸

The UK government is the only full, so-called Level 1, foreign F-35 partner in the CDP, but it could not allocate the 10% expected of full foreign partnership in the SDD phase. Nevertheless, the UK was accepted as a Level 1 partner and contributions from the other foreign partners had, in fairness, to be equally reduced. The UK Strategic Defence and Security Review (SDSR) in late 2010 drew the necessary conclusions from, first, the F-35 programme costs and delays and, second, Britain's own financial difficulties. These had consequences for defence acquisitions, even though the perceived need for two new 65,000-ton aircraft carriers remained. Instead of acquiring two F-35 versions as originally planned, the SDSR abandoned the F-35B Short Take-Off and Vertical Landing (STOVL) version opting only for the F-35C Short Take Off and Landing version and adapting the aircraft carriers, accordingly.⁹

Technology, friends, and competitors

Selling modern combat aircraft is not just, or even mainly, a matter of political friendship. Saab, for one, has learned this lesson on at least two occasions. In 1992, Finland rejected the JAS-39 in favour of Boeing's A/F-18 combat aircraft. Once Finland had freed itself of its Soviet security ties, Saab had more or less taken a Finnish order for granted because of close policy relations and Finland's previous purchases of Saab combat aircraft. The loss was a serious blow as it was Saab's first experience in the export market for new combat aircraft (it had previously only exported surplus/used aircraft).

One result was a joint venture (JV) with one of the major European military exporters, BAE Systems (then British Aerospace, BAe) for the development, as well as international marketing and sale, of the JAS-39. BAe succeeded in South Africa,¹⁰ but the Saab-BAe co-operation went sour after Saab arranged leasing deals with Hungary and the Czech Republic. Saab soon took over all export sales and by June 2011, BAE Systems had sold all its shares in the Saab company. The Czech Republic, like Hungary, will purchase the leased aircraft.

Wikileak documents¹¹ and press reports suggest that some of the Saab naiveté still remained when neighbouring Norway, a NATO member, signed a JAS-39 NG co-development agreement in early 2007. Norway by then had participated in the F-35 SDD phase – the competition thus involved two, not yet operational, aircraft. That year, the Kongsberg Defence & Aerospace group signed framework agreements with American aircraft companies for an estimated \$1 billion.¹² Even so, the JAS-39 has in many countries been their Air Force's as well as industry first choice. Saab's competitive advantage, apart from certain JAS-39 specifics, is that it is owned by the Wallenberg Financial Investor network, permitting advanced and varied technology and industrial arrangements.

This does not disregard other factors that play a role in the acquisition equation. Saab's success in South Africa depended on its British partner and, possibly, also on Sweden's secret policy during *apartheid* in South Africa and the fact that JAS-39 was part of a package deal. The combination of other military products may also have been important for Saab's success in Thailand. In Norway, the Norwegian defence industry association concluded that the technology contracts proposed by Saab carried more overall value than similar terms offered by LM and "was a unique opportunity to secure the future development of Norwegian industry, both military and civilian."¹³ Norway requested at least 100% industrial agreements (as offsets) and if Norway ordered 48 JAS-39 aircraft, it was reported that Saab offsets would cover >180% of the order value over a 10–15 year period.¹⁴

If technology sharing is not an important buyer criterion, second only after the aircraft itself, it is not likely to outweigh Saab's disadvantages: its limited global experiences and successes; that the JAS-39 is a light, one-engine, aircraft; that the JAS-39 NG version does not exist; is not on order even in Sweden; and, in particular for a NATO member, that Saab is not an American company. The military and security-political weight of these considerations should not be underestimated. Norway decided in the Fall of 2008 (followed by Denmark) to acquire the F-35, suggesting that neither neighbouring and friendly relations, nor more technology and employment, are sufficient conditions for winning such a deal.¹⁵ It was a hard decision to accept. Saab claimed that Norway had not made a fair evaluation of the offer.¹⁶ The US Embassy in Oslo even agreed that the F-35 offer was weaker than Saab's industrial one. The important and, perhaps, the winning US argument was that the F-35s capabilities were better suited to meet Norway's requirements.¹⁷

Nonetheless, access to US technology together with industry participation were strong arguments for paying the F-35 foreign partner fees. The Stockholm International Peace Research Institute (SIPRI) had already concluded in 2002 that the F-35 programme was not a good example of

future transatlantic co-operation.¹⁸ Indeed, programme implementation to the benefit of all has proved complicated. First, there was never any guarantee that foreign partners would receive work or technology commensurate, or in parity with, the fee as neither offsets nor *juste retour* arrangements, only competition, was accepted. Several partners have complained about how the programme has evolved as well as the type and (limited) amount of work received, compared with their investment. To counter this critique, the F-35 programme has been described as an avenue for sophisticated offsets.

In theory, the expenditure of public funds by one country to support another country's weapon system development programme can be offset by access to developing technology that the first country could not have individually afforded and, subsequently, the opportunity to take part in producing the system and the jobs that its production would create.¹⁹ But theory, even when highly sophisticated, and reality seldom make a perfect fit. First, a pragmatic approach became necessary *vis-à-vis* some of the programme's foreign partners. LM has accepted work share/*juste retour* arrangements due to limited partner aerospace capabilities and promised predetermined work that satisfies a major portion of one country's expected return-on-investment. It has also waived competition for suppliers with which it has had a long-standing industrial relationship.²⁰ It is not known to what extent solutions such as these have increased programme costs, but part of foreign partners' criticisms may be related to such special treatment, especially when it is perceived as an injustice to others.

Second, even if the US government wanted to be restrictive in its technology sharing, demands for technology transfer do not only come from foreign partners, but also from the programme itself. In order to reach a high degree of interoperability with allied forces, US technology, some of it highly sensitive, must be shared. It has been concluded that, "the transfer of technology on the JSF program presents a number of challenges related to program execution, international suppliers, and disclosure policy ... the transfer of technologies necessary to achieve aircraft commonality goals is expected to far exceed past transfers of advanced military technology and will push the boundaries of US disclosure policy. ... If Lockheed Martin's efforts to meet partner return-on-investment expectations come into conflict with program cost, schedule, and performance goals, this could have a negative effect ... the JSF Program Office will ultimately have to make decisions to balance partner expectations and program execution."²¹

Technology sharing has, therefore, to be balanced against positive interoperability benefits and negative effects on US long-term technology leadership. Particularly, sensitive F-35 technology include low/counter low observable radar and propulsion (stealth) as well as the software source codes that define the aircraft's capabilities, limitations and adaptability to future demands, i.e. the aircraft's nervous system, or "the black box."²² Restrictive US technology-sharing policies have affected all partner countries, including the UK despite its long-standing transatlantic defence, intelligence and other types of sensitive security arrangements with the US.

In 2001, it was said that the UK would get access to stealth technology, but not be allowed to share it with others.²³ In 2009, it seems that BAE Systems was not allowed to manufacture the stealth wing edges even of wings manufactured in the UK.²⁴ In May 2006, it was said that, "US-UK defence technology-sharing is a technical and relatively obscure, but periodically explosive, issue."²⁵ Seven months later, the UK signed a Defence Trade Cooperation Treaty that would ease defence trade with the USA by exempting the UK from certain license provisions under the International Traffic in Arms Regulation. It took three years before it was accepted by the US Senate on 29 September 2010, but stealth, certain engine, and other technologies are excluded from the Treaty. So also is technology within the F-35 programme that is governed by special agreements.²⁶

Neither the UK, nor any other foreign partner, seem to have been given access to the F-35 source codes. The Head of the JAS-39 project in Norway claimed in 2007 that no country

would get information about what constitutes the nervous system of the F-35.²⁷ In other words, friends, even allies, should expect, even in a co-operative programme, to remain followers to the most advanced US military technology. It seems that Saab was not equally restrictive in India.

A self-sufficient India

Despite the failure of both defence industrial and political ambitions in Norway and Denmark, Saab marketed the JAS-39 in India as “the independent choice”²⁸ in an attempt to build on similarities between Sweden’s past and India’s present. Sweden’s formal security policy used to be based on military non-alignment in peacetime and neutrality in wartime, supported by a strong and independent defence industrial base. In reality, however, Sweden has been far from independent from foreign, not least USA, military technology.²⁹ For political reasons, Saab’s export slogan referred to India’s role in the non-aligned movement and its ambition to become militarily self-sufficient and independent from foreign suppliers.

Sweden’s security policy has changed³⁰ and India has failed to increase its defence self-sufficiency.³¹ SIPRI data show that the largest importers of conventional weapons in 2006–2010 were in Asia, with India being number one.³² The consultancy firm Frost & Sullivan projected in March 2011 that India’s modernization plan will make it the second highest defence spender in the Asia-Pacific region by 2016.³³ All major defence equipment suppliers want a piece of this defence-economic pie. For the USA, India is not just a potentially large military market. Major US arms contracts in India are a way to reduce India’s traditionally strong reliance on Russian military equipment. It is probably no coincidence that the USA and India have solved many of their nuclear and dual-use technology controversies since 2007.³⁴

The proposed JAS-39 IN version was, until late April 2011, competing for an Indian order for 126 Medium Multi-Role Combat Aircraft (MMRCA) and possible follow-on orders against the Boeing F/A-18 Super Hornet (also in Brazil), the LM F-16 IN Super Viper, the Russian (Mikoyan) MiG-35, the French (Dassault) Rafale (also in Brazil), and the multinational Eurofighter Typhoon. The last was developed to meet requirements in Germany, Italy, Spain, and the UK. In April 2011, the Rafale and Eurofighter Typhoon were short-listed by the Indian government. India’s intention is to make a final acquisition decision by the Spring of 2012. Although the F-35 is not part of the competition, an Indian interest in the F-35C STOVL version has been reported that could potentially influence the MMRCA competition.³⁵

Saab’s involvement in India illustrates Sweden’s politically supported arms export policy and an acceptance to sell her most advanced combat aircraft to a country with regional ambitions, political conflicts and faced with a potential risk of war (India versus Pakistan as well as China). It also demonstrates Saab’s willingness, or perhaps necessity, to take risks. Could, for example, Saab handle such a large order, including license manufacture, without negative consequences for other Saab activities? The Indian competition also shows the supplier acceptance of buyer offset demands (Table 1).

Although India is one of the latest countries to formulate a military offset policy, that policy has already been revised. Revisions of a nation’s original offset policy are common as governments learn from the experience of such policies from other nations and as political and industrial interests over time become more explicit and precise.³⁶ One such revision is to increase the share of the defence order’s value to be offset by the supplier. Although not a formal change of policy, the Indian minimum of 30% offset share was raised to 50% for the MMRCA programme in order to increase the benefits. Although the share is still low compared with international agreements, where 100% offset is not uncommon, the requirement is considerable because of the size of the MMRCA order.

Table 1. India's offset policy 2006–1011.

Category	2006 policy	2008 policy	2011 policy
Conditions for offset	<ol style="list-style-type: none"> 1. Direct purchase from abroad/JV (allowing normally 26% foreign share). 2. License manufacture (transfer of technology). 3. Cost > Rs 3 billion (about \$65 mm). 	<ol style="list-style-type: none"> 1. Ditto (JV \geq 50% Indian product content). 2. Ditto 3. Cost > Rs 3 billion 	<ol style="list-style-type: none"> 1. Ditto 2. Ditto 3. Ditto
Share of offset	<ol style="list-style-type: none"> 1. Minimum 30% of purchasing from abroad cost. 2. Foreign exchange component 3. Percentage may be increased under certain circumstances. 	<ol style="list-style-type: none"> 1. Ditto 2. Ditto 3. Ditto, possible to waive offset requirement. 	<ol style="list-style-type: none"> 1. Ditto 2. Ditto 3. Ditto
Activities	<ol style="list-style-type: none"> 1. Purchase of exports of <i>defence</i> products. 	<ol style="list-style-type: none"> 1. Ditto 	<ol style="list-style-type: none"> 1. Ditto, but reference to eligible, not defence.
Accepted as offset	<ol style="list-style-type: none"> 1. Components manufacture or services provided by public or private defence industry or ordnance factory board. 2. DFI in Indian defence industries infrastructure for services, co-development, JV, and co-production of defence products. 3. DFI in Indian organisations for defence R&D but no reference to defence as certified by the Defence Offset Facilitation Agency 	<ol style="list-style-type: none"> 1. Ditto 2. Ditto 3. Ditto, plus exception of infrastructure and openly available technology. 	<ol style="list-style-type: none"> 1. Ditto 2. Ditto, but reference to eligible, not defence 3. Ditto, plus exception of civil infrastructure, no reference to defence.
Time frame	Offsets to be fulfilled within the time of the main project unless otherwise agreed.	Ditto	Ditto
Banking	Not mentioned	Yes	Ditto
Punishment for not fulfilling offset	Yes, specified	Ditto	Ditto
Sources	Defence procurement procedure, Ministry of Defence, New Delhi, 22 August 2006.	Defence procurement procedure, Ministry of Defence, New Delhi, 29 July 2009.	Defence procurement procedure, Ministry of Defence, New Delhi, 27 December 2010; Amendment, 11 May 2011.

Another common offset policy change, especially in countries with offset policies dating from the 1970s and 1980s, has been to move away from a mix of military and civilian offsets to one that demands only military offsets. In India, the change has been in the opposite direction in response to the reactions from foreign MMRCAs competitors. In a joint letter in August 2010, they

requested that India define a more liberal offset policy, one that would permit non-defence offsets including Direct Foreign Investment (DFI). This request was most likely based on three considerations: first, that the advanced Indian defence market is limited; and second, that the Indian MMRCAs request for proposals (RFP) did not accept banking, i.e. a possibility for foreign suppliers to save earned offset points for future orders. When introduced in 2008, banking was limited to the main contractor and its sub-contractors within the same acquisition programme. Third, the use of multipliers, i.e. the possibility for a supplier to receive more offset credits for certain types of offsets (for instance, certain technology or services over goods), was not part of the Indian policy. As a result, because the original MMRCAs offers were based on the term of the 2005 offset policy, the letter claimed that it was difficult to fulfil the requested 50% defence offsets.³⁷

As suggested in the letter, the 2011 offset policy is a step in the direction also permitting offset products, components, and services in civil aerospace and internal (homeland) security.³⁸ This could involve, for example, air, maritime and mass transport security as well as infrastructure protection. The Indian Ministry of Defence was, like the defence industry, initially opposed to these and other proposed revisions as they could reduce the possibilities of strengthening the Indian military industrial base.³⁹ Ministry acceptance was combined, however, with a Defence Production Policy that argued for public and private, including academic, activities in support of Indian military self-sufficiency.⁴⁰ Also, in December 2010, it directed the Defence Acquisition Council to study: (1) whether the transfer of technology (ToT) should be eligible for offsets, a change that would be welcomed by the Defence Research and Development Organisation that believes that applied defence R&D co-operation with the USA is likely to become possible;⁴¹ (2) whether offset multipliers should be introduced; (3) the means to evaluate, monitor and audit anticipated offsets; and (4) the present banking policy.⁴²

Another issue under discussion is whether to increase the 26% foreign JV share as that share is regarded as being too low to interest foreign companies in establishing JVs. The Ministry of Finance suggested 49% in 2009 and the Ministry of Commerce and Industry's Department of Industrial Policy and Promotion in 2010 suggested 74%. The Ministry of Defence, however, expressed doubts that the defence sector could absorb a high inflow of military technology.⁴³ Above all, India's priority is to get military equipment quickly into her defence organization.

"ToT" is a term used in the Indian offset policy for both license manufacture and infrastructure maintenance in support of an imported product. In the Indian order, 108 of the 126 MMRCAs are to be license manufactured by Hindustan Aeronautics Ltd. The MMRCAs RFP stipulates 85% ToT, calculated on the foreign exchange component.⁴⁴ This was a new challenge for Saab in addition to the magnitude of the order, factors that may have influenced India not to shortlist the JAS-39 IN. Not even the Saab industry and technology offer, one that reflected an ambition to succeed with an independent alternative, convinced the Indian government. The offer included: an industrial package said to meet every offset requirement; technology transfers that would allow local industry to absorb know-how and state-of-the-art technologies with applications in military, security, and civil domains even after Saab's contractual obligations and beyond current applications; and full Indian access to all levels of Saab's aeronautical technology that would make India "completely independent of the need to purchase combat aircraft from other countries; and make India an exporter of aircraft by 2020."⁴⁵ Saab seemed prepared to adapt the JAS-39 design to permit its operating from Indian aircraft carriers⁴⁶ as well as an offer of access to at least some, if not all, important JAS-39 source codes.⁴⁷

Where we could be heading?

There are no perceived external military threats to Europe for the foreseeable future. Just in case, military organizations nevertheless have argued the need to modernize national defence forces.

Such arguments find political support in on-going international operations, some of them distanced from what could be construed as a direct European threat. Modern combat aircraft, as well as other modern weapons, are expensive; parliaments, sometimes, even, governments, are not always willing to pay the cost. This is true even in countries that have traditionally supported broad and advanced indigenous military R&D and production. Alternative options in order to support a military industrial base include shared costs through international cooperation and/or arms exports. Out of economic necessity, export policies have either to be formally permissive or, at least, allow permissive interpretations.

Harmonized European arms export policies have not erased European competition in foreign markets, as illustrated in the case of India. The global arms market has become a buyer's market. This is recognized by more and more buyers and is reflected in the number and revisions of offset policies, policies that are accepted by suppliers as an evil necessity. For India, imports and offsets have become a means by which to realize its military self-sufficiency ambition. What seems to be lacking, however, is an analysis of the long-term feasibility of such a policy and its alternative costs. For Sweden, a country that sustained an advanced indigenous military industrial base from the 1940s, policy has been caught up by reality. Defence imports have become the most important acquisition alternative as savings, availability, and international operability with friends have become guiding principles.⁴⁸

It is worth remembering that wars after 1945 have been fought with more and more unconventional conventional weapons, not with nuclear weapons. This does not imply that international control in areas of weapons of mass destruction has been useless; perhaps the focus and allocation of arms control resources have not been optimal. It is suggested here that conventional arms control agreements have had a limited effect on most nations' ability to fight wars. National conventional weapons export policies based on long-term international peace and human security considerations, rather than on shorter term national political/security and industrial economic interests, are not to be seen in the "fog" of the future. Moreover, in European countries, many defence industries are partly or wholly foreign owned. Ought not the permission to let one's own citizens work in foreign military industries within one's own borders be regarded as a form of military export?

Two European aircraft remained in early 2012 for the Indian MMRCAs order: India might become a fifth Eurofighter Typhoon partner⁴⁹ or benefit to the same extent as Israel if the Rafale is selected.⁵⁰ Assuming that not only the purchasing price is decisive and that the winner can offer equal or similar benefits as Saab, India could learn how to manufacture a 4+ generation combat aircraft. The Indian ambition to stay ahead of potential adversaries could be achieved by modernizing the aircraft, implying future access to technologies, and components not available today. One or more Indian companies could, in co-operation with a foreign supplier, handle aircraft maintenance, spare parts support, as well as base repairs during the aircraft's entire lifetime. India may also become an exporter of combat aircraft and thus a new competitor to some foreign producers. If this can be offered and realized in India, it can also be done in other countries. Not only combat aircraft and their armaments, but also the skills to manufacture such aircraft, are likely to proliferate.

Neither close and friendly relations, nor modern technology, are by themselves sufficient for a small independent producer to win a major combat aircraft order. Sometimes this is true also of major producers. Disadvantages for the American MMRCAs competitors probably included US technology transfer restrictions and India's previous experiences of such restrictions, as well as US negative attitudes to defence offset arrangements. US business representatives reported from the 2009 Brazilian defence equipment exhibition that the Brazilian government perceived the USA to be reluctant to transfer technology and that there was concern over US export controls.⁵¹ It was noted by the US National Security Advisor in early 2010 that the USA must be

seen in India to be sharing technology.⁵² Still, it should not have come as a surprise had one of the American contenders remained among the Indian short-listed aircraft. To buy from the USA could be a way for India to make the present positive phase in US–India friendship visible.⁵³ On the other hand, the Indian government must not make decisions that could be accused of being political or in other ways manipulated.

Although the short-listing has been made, a major arms deal is not concluded until a contract is signed. Saab, Boeing, and LM will follow the continuing competition closely. The MMRCAs are a complicated deal, not least because of the license manufacture. Transfer of technology involves complicated intellectual property rights issues at both the supplying and receiving ends. Solving them may delay the MMRCAs programme, pulling the old contenders, perhaps also the fifth generation F-35 alternative, into the race. Problems or delays in India's co-operation with Russia for a Fifth Generation Fighter Aircraft could further support the F-35 option. Australia, which has selected the F-35 as its future combat aircraft, has already bought the F/A-18 E/F aircraft as an interim solution and Japan has short-listed the F-35, the F/A-18, and the Eurofighter Typhoon.

Perhaps the suggestion from Spring 2011, that the F-35 could be a “bonus” for India if an American aircraft is selected for the MMRCAs, should not yet be dismissed. As concluded by the Managing Global Insecurity project, history is not fixed. Leadership and effective policy matter and choices have consequences.⁵⁴ Today's friend and arms recipient may be tomorrow's enemy or the enemy of a friend. What may seem naïve at the time may, in retrospect, look wise. In the long-term, the changes in the Indian 2011 offset policy may be positive despite criticism that they could delay India's defence-technological independence. The question is, whether or not there is such a thing as defence-technological independence for countries that are in competition with a technological leader?

Looked at from a different point of view and with a wider perspective, India's 2011 policy could benefit India's commercial and economic development. This is in contrast with Europe, where national offset policies focus on receiving military offsets, in part to avoid unfair competition in Europe's free civilian trade. There is an ambition within the European Union (EU) to get rid of the Lisbon Treaty Article 346 permitting exceptions to free trade if national security is involved. While waiting for the day when there is no exception article, the EU Commission in December 2006 published an interpretation of Article 296 in order to limit its most extreme applications.⁵⁵ In 2008, the European Defence Agency (EDA) formulated a Code of Conduct on Offsets that, through openness and control, was designed to contribute to a balance between the ambitions of a European defence technology and industrial base (EDTIB), a fair European and global defence market, and remaining offset demands.⁵⁶ It went into force in July 2009.

Offsets by EU members should, according to the EDA Code, increasingly support EDTIB, the so-called “intelligent offset.” But how intelligent is it to support defence activities in a region where there is no foreseeable military threat and where there are serious national economic difficulties that demand the assistance of several EU nations in solving them? Although defence spending in Europe is, today, relatively low, national defence expenditures in Europe, the USA and other nations are substantial in comparison with expenditure for basic human needs in other parts of the world – or, for that matter, for parts of the populations in Europe, the USA, and other high military spenders.

Most econometric studies support the argument that non-military activities are better than military activities in generating economic development. Commercial technologies have also become increasingly important for military applications, thereby reducing the need for applied military R&D in certain technology areas. Moreover, the EU has not only a habit of comparing itself with the USA, but also harbours an ambition to become a technological leader, even to achieve technological independence,⁵⁷ by supporting national and common/joint technical

developments. That is only marginally helped by unplanned, *ad hoc* and late spin-offs from military projects.

The EU seems willing to support the development of democracy in North Africa and the Middle East after the public uprisings during 2011. But how is democracy best achieved and supported? To force democracy on a foreign nation through the use of military means has proved difficult, if not impossible, as peace after war is not automatic. Not to lend, lease or sell weapons or dual-use technologies to undemocratic governments is so obvious that it should not have to be mentioned. But democracy is complicated as it is not “either-or”, or black, or white. It has its shades of grey, especially in the security policies of governments where non- or less-democratic countries support one’s friends or fight one’s enemies. Unfortunately, the UN and the EU can be used to avoid national decisions: if a potential recipient, democratic or not, is not under a UN or EU embargo, few governments are likely to abstain from military exports, either voluntarily and for moral reasons, if such exports are perceived as beneficial.

International relations are likely, over time, to become more complicated and involve both common and competing political, security and commercial interests. National governments cannot rely on international organizations for achieving “the common good.” Many international issues scored low in the European Council of Foreign Relations’ scorecard for 2010.⁵⁸ The EU and individual European as well as other governments, might gain from (re)considering if and how arms and military technology transfers support peace, stability, economic development, a fair distribution of income and wealth, the environment, sustainable human and other life, as well as democracy and long-term security.

Notes

1. Björn Hagelin, ‘Science, Secrecy and Spies’, *European Security* 18, no. 4, (2010): 483–500.
2. JAS-39 Gripen is in service in Sweden, South Africa, Thailand, Hungary, and the Czech Republic. The UK Empire Test Pilots’ School uses the aircraft as a platform for test pilots.
3. Saab in December 2011 offered the Swedish government 100 JAS-39E/F.
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