Algemene Rekenkamer

Lessons learned from the JSF project

Keeping major defence procurement projects under control

2019

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The original report *Lessen van de JSF; Grip krijgen op grote projecten voor aanschaf defensie-materieel* was adopted on 11 March 2019. It was presented to the Dutch House of Representatives on 28 March 2019.

Contents

1 Introduction

Projects involving the procurement of large-scale defence materiel tend to be both big and complex. This is due to the specialist and often innovative technology associated with them, the high cost of investment and the need for confidentiality. Moreover, where such projects involve international partnerships, they are accompanied by elaborate financial, technical and legal agreements. Although many are regarded as one-offs, this is unlikely to apply to all aspects of such projects. We know from our audits that these projects tend to have a great deal in common with each other and that we can learn from the experiences gained with past projects. The aim of this publication is to ensure that future decisions can indeed benefit from the lessons learned from the past.

Lessons learned from the F-16 project

21 years ago, on 26 April 1998, the Netherlands Court of Audit presented an audit report entitled *Lessons learned from the F-16 project*[1] to the Dutch parliament. This report was a joint publication by the national audit offices of Belgium, Denmark, the Netherlands and Norway. All four audit offices had performed a large number of audits into the joint procurement of a fleet of F-16 fighter aircraft, a deal referred to at the time as 'the order of the century'. The audit report set out a number of conclusions and lessons learned that the four countries' defence ministers were advised to take to heart in future air force procurement contracts.

The decision-making process: F-16 v. JSF

By the time the report was published, preparations were already underway for what was to become the order of the next century: the purchase of the JSF (or F-35 Joint Strike Fighter) as the successor to the F-16. It is interesting to see from the parliamentary papers from the 1970s about the decision to replace the Starfighter with the F-16 that there were plenty of similarities with the political process surrounding the choice of the JSF as the successor to the F-16. There is one striking difference, however, and that is the fact that the decision-making process on the F-16 was completed within just under one year, whereas it took considerably longer to decide about the JSF. In September 1996, the Minister of Defence included a statement in the draft budget for 1997 to the effect that the ministry was planning to replace the F-16.[2] It was not until over 17 years later, in 2013, that the Dutch government eventually decided to opt for the JSF. Delivery of the aircraft is due to come on stream in 2019.

Decision-making process on replacement of Starfighter lasted less than one year

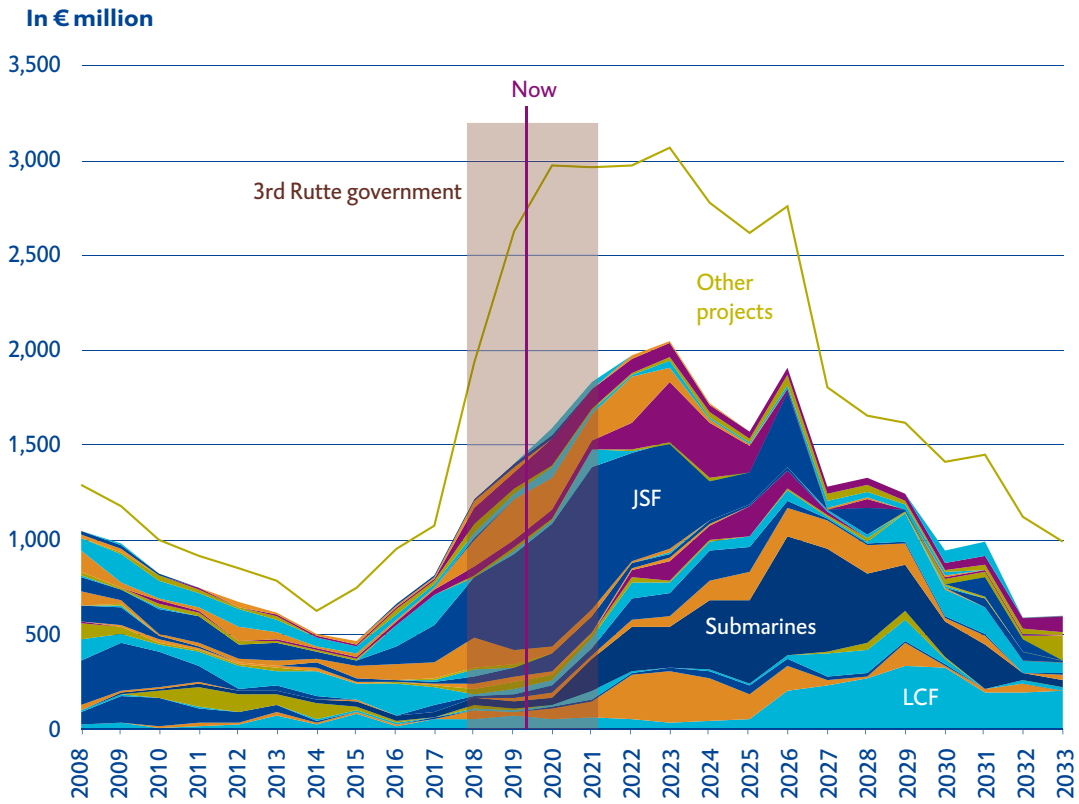
The first mention by the Minister of Defence of any need to replace the Starfighter came in the 1974 Defence White Paper (Ministry of Defence, 1974). The date of publication was 9 July 1974. Less than a year later, on 10 June 1975, the Dutch Minister of Defence, Henk Vredeling, signed a memorandum of understanding on the co-production and procurement of the F-16. The first aircraft were delivered in 1979. The Netherlands bought a total of 213 F-16s, 61 of which were still operational at the start of 2019.

Lessons learned from the JSF project can be applied to new procurement projects

The Ministry of Defence is planning to undertake around 30 new defence materiel projects during the current government's term of office. The total value of these projects lies between € 6 and € 17 billion (see Figure 1 and Appendix 2). We believe that this is a good opportunity to reflect on the experiences gained with the JSF project. Against the backdrop of the forthcoming projects, this report highlights the findings of some of our past audits. The title, *Lessons learned from the JSF project*, is intended to be reminiscent of our 1998 report, which was entitled *Lessons learned from the F-16 project*.

Figure 1 shows the cost of investments in weapon systems (in 2018 prices). Up to and including the publication of the 2018 budget, the Minister of Defence used to publish these figures as an appendix to the ministry's draft budget. The table shows the cost of investments in the 27 largest weapon systems used by the armed forces, together with a 28th category, representing the remaining investments over a five-year period in the past and a 15-year period in the future. Each coloured layer represents expenditure on a single weapon system. In the middle, in blue, is the expenditure on the JSF. It is clear from the pattern in the figure that large investments are projected after the completion of the JSF project, for example in submarines and frigates.

Many new defence procurement projects due to start during current government's term of office



1. Other weapon systems
2. Mobile combat training centre
3. Titan command and control system
4. Military satellite communcation
5. Clothing and personal equipment
6. Small-calibre weapons
7. NH-90
8. AS-532 Cougar
9. CH-47 Chinook
10. AH-64 Apache
11. C-130 Hercules
12. KDC 10 tanker en transport aircraft
13a. F-35 (JSF)
13b. F-16
14. Mercedes Benz (and light goods vehicle)
15. Unmanned aerial vehicles
16. Artillery
17. Support tanks
18. Switch-back systems and tractor-trailer combinations
19. Ground-based air defence
20. Armoured wheeled vehicles
21. CV9035NL infantry combat vehicles
22. Minesweepers
23. Submarines
24. AOR / Joint support ship
25. Landing platform docks
26. Patrol vessels
27. Multi-purpose frigate
28. Air defence and command frigate (LCF)

Figure 1 *Programme of Ministry of Defence investments*

2 The JSF

The Joint Strike Fighter (JSF) or the Lockheed Martin F-35 Lightning II is a new fighter aircraft designed and produced by the United States in an alliance with eight international partners.[3] The Netherlands has been one of these partners since 1996, and during the intervening period has gradually become more and more closely involved in the programme. As a partner in the international JSF programme, the Dutch Minister of Defence contributes towards the cost of developing and producing the aircraft, as well as towards the cost of setting up a worldwide maintenance network for the JSF. The proportion of costs paid by the partner countries varies from one year to another. The United States pays around 80% of the development costs, while the Netherlands contributes around 2%. The Dutch contribution to the partner programme is approximately € 1.74 billion, the bulk of which has already been paid. The Netherlands is able to recoup part of this investment, principally in the form of royalties paid on aircraft sold to countries that are not partners in the programme.

Both a partner and a customer

In 2013, the then Dutch government published a policy document entitled *In the interests of the Netherlands*, in which it announced that it had decided on the JSF as the successor to the F-16. This decision meant that the Netherlands was no longer merely a partner in the international JSF programme; it was henceforth also a customer. This dual role has afforded the Netherlands certain financial benefits, such as a discount on the purchase price. The procurement of the JSFs and all the related equipment required for operating them requires an investment of € 4.5 billion.[4] The first orders were placed in 2015 and the idea is for the aircraft to be delivered during the period between 2019 and 2023.

The JSF project

The term 'JSF project' refers to the Dutch government's involvement with the JSF, starting with its participation in the US JSF programme and ending with the delivery of the JSF aircraft as successors to the fleet of F-16s.[5] The decisions taken on the project, and the implementation of these decisions, cover a period extending over nine different governments. This period is set to continue for a number of years after 2019.

The Dutch involvement in the JSF programme had a great deal to do with the replacement of the F-16. Broadly speaking, the decision-making process on the procurement of the JSF followed what is known as the Defence Materiel Process (DMP).[6] Parliament was regularly updated (by the submission of documents known as DMP A, DMP B/C, and DMP D letters) on the status of the process.

In 1997, the Lower House of the Dutch parliament (the 'House of Representatives') designated the project for the replacement of the F-16 as a 'major project' under the Regulations on Major Projects. This meant that the government had to meet a number of special reporting requirements.[7] Since the publication of the Basic Document on 15 March 2000,[8] the Minister of Defence and the Minister of Economic Affairs and Climate Policy have been under an obligation to supply parliament with regular progress reports on the status of the project. A series of special 'Memoranda setting out the information requirements underlying the Major Project for the Replacement of the F-16', published in 1999, 2009 and 2014, contained detailed arrangements for communications between parliament and the Minister of Defence. These arrangements concern the frequency with which the progress reports should be published and the type of information they should contain.

Duration of JSF project extends over 9 Dutch governments

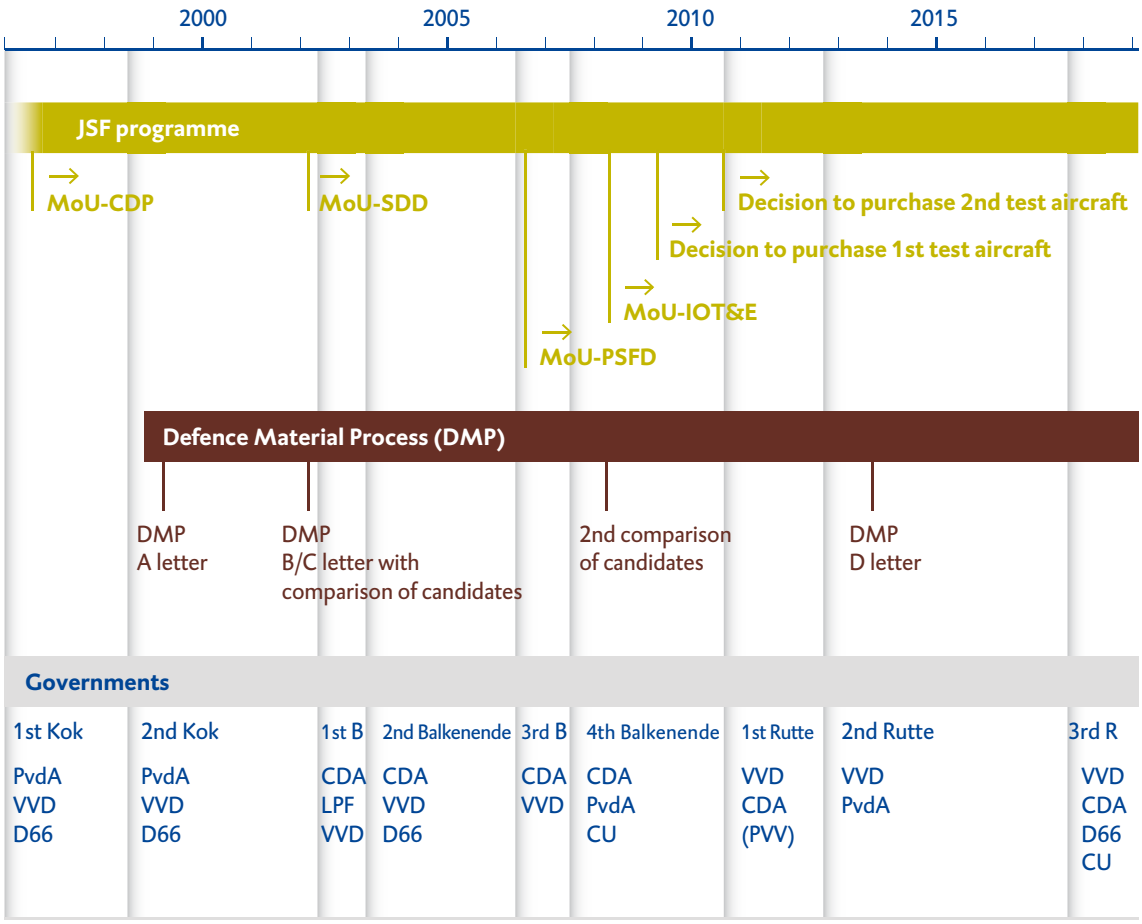


Figure 2 *Time line of the JSF project. See also Appendix 1.*

Audits performed by Netherlands Court of Audit

We have audited the government's involvement in the replacement of the F-16 throughout this period. We have published our findings in the form of audit reports and letters to parliament.

In 2013, we set up a special website devoted exclusively to the JSF project: http://vervanging-f16.rekenkamer.nl/. The information was updated in 2019 and is now available as a special section on our general website: https://english.rekenkamer.nl/.

3 Lessons learned from the JSF project

Our audits of the JSF project have taught us some valuable lessons. Other large-scale projects have also generated a number of useful examples. The end result is a series of 11 lessons that the Ministry, parliament and other stakeholders can put to good use in future defence procurement projects.

The sequence of the lessons outlined in this report follows the sequence of the Defence Materiel Process (DMP). The DMP was created in the 1980s in response to problems affecting the development of Walrus-class submarines.[9] The status of the DMP at the Ministry of Defence is similar to that of the Multi-year Programme for Infrastructure, Space and Transport in relation to infrastructural projects.

The DMP is designed not simply for managing the decision-making process at the Ministry of Defence, but also for systematically informing parliament about the results of each stage of the decision-making process. The DMP consists of five stages (or phases): A, B, C, D and E. The Minister reports to parliament at the end of each stage, in a letter describing the results of the stage in question. Thus, parliament receives what is known as an 'A letter' at the end of stage A, a 'B letter' at the end of stage B, etc.[10] The fact that the DMP is broken down into stages makes it a handy rack on which to 'hang' our lessons.

The report concludes with a number of general recommendations, on which the DMP does not have any bearing.

3.1 Phase A of the DMP: analysis of requirements

1. Define the materiel requirements on the basis of the tasks performed by the armed forces

The decision-making process as set out in the DMP is based on an assumption that the first step in the procurement of defence equipment is to decide what new military materiel is needed by the armed forces (this is known as phase A of the process). Only then is the following step taken, i.e. a preliminary study of how best to meet this need (phase B). A brochure entitled *DMP bij de tijd* ('A modern DMP') published by the Minister of Defence in 2016–2017, states that the Minister is required to inform parliament in what is known as an 'A letter' about the need for certain types of materiel. The nature of the need should be the result of a combination of policy and readiness requirements, and should take account of NATO and EU capacity needs.

Parliament should try and ensure that the debate on the A letter is based on the following three factors:

- the national security strategy and the operational tasks and roles that the government sees the Dutch armed forces performing as part of this strategy;
- the resultant need for military capacity; and
- the weapon system in question.

One of the reasons why this is important is because of the major financial ramifications of the procurement of defence materiel.

Given that the definition of the materiel requirement forms a reference point for every subsequent stage of the procurement project, the government's definition needs to secure explicit parliamentary support at this stage.

2. Avoid false starts

Before the government decided on the need to replace the F-16, the Minister of Defence had already signed up to the Concept Demonstration Phase (CDP) of the US JSF programme. This involved the payment of a sum of USD 10 million. The government also awarded the Dutch aviation industry a grant to the tune of € 68 million (NLG 150 million at the time) in order to enable aviation companies to prepare for JSF-related orders.
Following the CDP, the Netherlands then entered the following phases of the JSF programme (see Figure 2 in chapter 2):

- the development phase, in 2002;
- the production phase, in 2006;
- the operational test phase, in 2008. The Minister of Defence purchased two JSF aircraft for this phase.

US programme timetable vs. Dutch decision-making process

The Netherlands gradually became more and more closely involved in the JSF programme. This process of ever closer involvement did not take place in parallel with the decision-making process on the replacement of the F-16 as laid down in the DMP (see Figure 2 in chapter 2). This had everything to do with the momentum created by the US JSF programme, which was launched back in 1993, long before the Netherlands signed up to it. The US JSF programme regularly moved on to a following stage, at which point the US administration invited the Dutch government to join in. This meant that, in reality, the pace of the decision-making process in the Netherlands was dictated by the timetable applying to the JSF programme in the US.

Formally speaking, the Dutch government continued to observe the DMP. At each new stage of the JSF programme, ministers reassured parliament that they were not prejudging the decision-making process on the replacement of the F-16. The discrepancy between the ever closer Dutch involvement in the JSF programme and the lack of progress in the DMP presented the government with a dilemma: on the one hand, no formal decision had yet been taken to purchase the aircraft. On the other hand, the government was investing ever increasing sums of money in the development of the JSF. As a result, the Netherlands found itself moving ever closer to the JSF, even though parliament did not have any clear opportunities to express its view on the route chosen by the government.

The lesson that the government and parliament should learn from the experience with the JSF project is the need to be cautious in moving faster than the logical sequence of steps set out in the DMP.

3. Present realistic information on the available resources, if necessary on a confidential basis

Under the terms of the DMP, which was revised in 2016, the A letter presented to parliament contains an analysis of requirements and is *not accompanied by a cost estimate*. Instead, the A letter sets out the financial bandwidth for the procurement project. However, these are very wide margins that have very little informational value. According to the brochure entitled *DMP bij de tijd* ('A modern DMP'), no accurate cost estimates can be produced during phase A as they would be too restrictive. Moreover, the early disclosure of such information might undermine the government's negotiating position.

Information needed about available resources

We wrote as follows in 2016, in connection with the A letter on the replacement of the submarine capacity: 'It makes sense not to produce an accurate *estimate* of the desired level of investment during phase A (analysis of requirements), given that such estimates may easily lead a life of their own during the project.'[11] However, every economic entity, whether a firm, household or national economy, needs to form a picture of the *resources that are available* for a major investment in order to form an opinion on it. This is because it is not possible to define a capacity requirement without attaching any consequences to it. Information on the level of available resources, as part of a complex set of commitments and plans, necessarily produces a sense of realism and prevents major investment schemes from unintentionally crowding out other necessary forms of expenditure.

In order to foster a full debate on the analysis of requirements, we believe that the A letter should contain information on the level of available resources to cover both the capital

expenditure and the operating costs. The Minister should also explain in the A letter how these resources compare with the total level of long-term defence expenditure. In our letter on the A letter on the replacement of the submarine capacity, we wrote that, if necessary, the Minister could inform the Dutch Lower House on a confidential basis.[12]

3.2 Phase B of the DMP: study

4. Compare alternatives

The assumption made in the DMP is that an objective assessment is made in phase B of the process of how the requirement formulated in phase A can best be met. This assessment consists of a comparison of the alternatives, based on their distinguishing features. The aim of the study is to safeguard the interests of the State, i.e. to ensure that the best product is purchased for the best price.

The DMP states that alternatives should be compared in terms of the following aspects:

- the functional requirements formulated in phase A (i.e. the 'need');
- the life-cycle cost of each alternative;
- the opportunities for international cooperation;
- the internal business aspects for the Ministry of Defence;
- the associated risks;
- the opportunities for Dutch manufacturers.

Any features that are common to all alternatives do not necessarily need to be included in the comparison as they do not affect the outcome. On the other hand, any features that differ from one alternative to another do need to be included in the comparison. If they are not, the chosen option may result in unpleasant surprises – such as much higher than expected costs.

Comparison of alternatives and cost-benefit analysis

In its present form, the DMP also requires a cost-benefit analysis to be performed. This is not the same as a comparison of alternatives. There is a fundamental difference between the two, in that a comparison of alternatives focuses on the differences between the alternative options and disregards the similarities. A cost-benefit analysis, on the other hand, must take account of all costs and set these against the benefits. Ideally, a cost-benefit analysis should be performed of all the alternatives on the table. There was no requirement to perform a cost-benefit analysis at the time when a decision was taken on the replacement of the F-16.

Four important points should be taken into account when undertaking a comparison of alternative options:

- *Start with the requirement*: starting with the requirement (expressed in terms of the requisite level of capacity) means that more potential alternatives are drawn into the equation. The requirement is the reference point for comparing these alternatives.
- *Be objective*: only an objective, unprejudiced comparison of the potential alternatives generates the best alternative for the best price. In order to bring this about, sufficient counterbalancing weight should be brought to bear in the comparison, for example by involving personnel from other services in the study.
- *Take a balanced view*: the analysis and comparison of alternatives should be balanced in order to avoid tunnel vision. At the time, the following six alternatives were contemplated for the replacement of the F-16, in addition to the procurement of the JSF: keeping the F-16 operational for a longer period, purchasing the Advanced F-16, purchasing the Eurofighter Typhoon, purchasing the Dassault Rafale, purchasing the F/A-18 E/F Super Hornet and purchasing the Saab/JAS-39 Gripen. Two separate assessments were made of these candidates. At the time these were performed, the State Secretary for Defence repeatedly stressed that far more information was available about the JSF than about the other options. This was due in part to the Dutch involvement in the US JSF programme.

No balanced comparison of alternatives in relation to the Betuwe railway line

In our report entitled *Beleidsinformatie Betuweroute* ('Policy information on the Betuwe freight railway line'), we concluded that, while the government had conducted a great deal of research into the (preferred) rail option for the Betuwe route, it had scarcely examined the possibility of using existing railway lines or waterways. In part for this reason, we were highly critical about the evidence adduced in support of the decision to construct the Betuwe railway line.

- *Take account of all distinguishing features*: it is not always easy to decide which particular factors should be taken into account when making a comparison of alternatives. In our reports on the JSF, we pointed to the cost of modifying the runways and the need to increase the size of the hangars for the JSF. These points were not initially included in the estimates made by the Ministry of Defence – until we pointed out that the estimated cost varied from one candidate to another, which meant that it needed to be included in the comparison.

The four points described above provide a framework on the basis of which the Dutch parliament can assess the comparison of alternative candidates. Under article 14 of the Regulations on Major Projects, the Lower House is entitled to reject information supplied by the Minister and instruct him or her, if the information supplied is inadequate, to supply the House with more detailed or more accurate information.

5. Assess impact on employment from a national perspective

One of the arguments regularly cited by the government in favour of signing up to the US JSF programme, was that participation in the programme would be good for jobs and innovation in the Netherlands. However, no guarantees were ever given to substantiate this forecast.

Both the Netherlands Bureau for Economic Policy Analysis (CPB)[13] and SEO[14] Amsterdam Economics (a research agency) reckon that the figure for the number of jobs created by the JSF programme is probably grossly exaggerated. Both organisations have demonstrated that any assessments of such predictions should be based on the figures for the *net* number of jobs created. Net employment is calculated on a national basis and not as a figure for an individual company. Both the CPB and SEO Amsterdam Economics concluded that, while the JSF project might indeed create jobs in *individual businesses*, it would not lead to a higher level of employment *on a national scale*. This is particularly true in the long term. The reason for this is that the jobs created by the project are temporary and displace jobs on other projects. In other words, companies who win orders for work on the JSF attract staff who would otherwise be working on the Airbus, for example. On balance, therefore, there is no increase in aggregate employment.

3.3 Phase C of the DMP: follow-up study

6. Keep the development project under control

The development of a weapon system (phase C) may well come with delays and higher than projected expenditure. This was the case, for example, with the construction of Walrus-class submarines in the 1990s. The project overran the budget by more than 65% and construction work was plagued by delays.[15]

The problem of keeping a development project under control is very different than with the purchase of an existing product. This is because a development project is more unpredictable by its very nature: there are many unknowns the nature of which still needs

to be discovered. It is not always easy to forecast in advance exactly how much time and money is likely to be involved in uncovering these unknowns. Equally, it is difficult to know how things are going to turn out in practice. Other than with an 'off-the-shelf' purchase, this makes it harder to make any firm output projections, while the cost of such development projects can easily spiral.

Product, time and money are the three routes to keeping a development project under control. *Product* and *time* refer to the nature of the deliverable and the date of delivery. If the proper procedure has been followed , both these elements will have been specified in phase A, the analysis of requirements. In phase C, this information acts as a point of reference for the government and parliament to decide what is and is not necessary. If no terms of reference or list of requirements have been formulated for the development of a weapon system, this may result in delays and a higher level of cost. The development of the Walrus-class submarine referred to above is a good example of the effect this can have in practice.[16]

Money is the third basis on which a development project can be kept under control. In the case of the F-16, development had already reached a much more advanced stage by the time that the Netherlands signed up to the joint project in June 1975. The European partners had set a 'not-to-exceed price' of USD 6.09 million per aircraft.[17] Although the Americans initially gave the impression of regarding this figure as no more than a guideline, the European partners made clear that it really was a maximum that could not be exceeded. This had a big impact on the ability of the project partners to keep the cost of the aircraft under control.[18]

When the Netherlands joined the development stage of the JSF programme in 2002, the projected price of a JSF was USD 37 million.[19] By 2013, this figure had risen to USD 86.1 million, and it subsequently fell to USD 76.5 million in 2018.[20] While this increase was of course due in part to inflation, the price hike was caused mainly by overoptimistic forecasts and the ramping up of the specifications.
While no not-to-exceed price was set for the JSF, the Minister of Defence did succeed in keeping the cost of Dutch participation in the JSF programme under control by setting maximum limits for the Dutch contributions in the memoranda of understanding (MoUs). The arrangement was that the US (which, thanks to its role in the programme, was better placed to influence the level of cost) would pay for any development costs in excess of these limits. It would be worth using a similar measure in future development projects.

3.4 Phase D of the DMP: procurement

7. Make sure you know what the future holds

Phase D is the phase in which the Minister decides to purchase the materiel in question. Given that the Netherlands takes on a big financial commitment at this juncture, the information given to parliament at this point should dispel most of any remaining doubts. In other words, parliament needs to know what lies ahead, i.e. what is in store for it.

Financial figures supporting the proposed decision

We believe that the information provided by the Minister of Defence in the policy document entitled *In het belang van Nederland* ('In the interests of the Netherlands') is a good example of how parliament should be informed about a proposed decision to purchase materiel. The Minister supported her proposal by supplying information on five different points:

- the investment cost;
- the operating costs;
- based on the aircraft's entire life cycle;
- as compared with aggregate defence expenditure;
- as compared with the operational requirement.

Validation of the policy document entitled *In het belang van Nederland* ('In the interests of the Netherlands'): clear financial underpinning of the decision to purchase the JSF

In a policy document entitled *In het belang van Nederland* ('In the interests of the Netherlands'), the Minister of Defence provided the following information to support her decision to purchase the JSF: she analysed both capital expenditure on and the operating costs of the armed forces' 27 largest weapon systems, together with a 28th group encompassing the remaining weapon systems and looking five years into the past and 30 years into the future.[21] The investment cost and the operating costs for the JSF were included in these figures. The government also set firm budgetary limits for both types of expenditure in relation to the JSF. These limits may not be exceeded.[22] In our report entitled *Validering nota In het belang van Nederland* ('Validation of the policy document 'In the interests of the Netherlands'), we concluded that the decision was underpinned by the 'best possible' financial approximation.[23]

The way in which the policy document entitled *In het belang van Nederland* ('In the interests of the Netherlands') was financially underpinned, represents a big step forward. We believe that this had the effect of preventing the Ministry of Defence's investment portfolio from being constantly flooded by fresh waves of projects, without it being clear whether or not these projects were financially feasible.

The Ministry of Defence will now be allocated a defence investment fund; this may well be followed in the future by an accounting system that provides a clearer picture of the costs and benefits. We hope that this move will help the Ministry both in its decision-making and in its project management, with the aid of what proves to be the most suitable accounting system.

Analyse risks

A clear risk analysis is part and parcel of knowing what the future holds. There are two types of risk in procurement projects, i.e. those risks over which the Ministry has some degree of control, and those risks over which the Ministry has no control. The Minister must take the necessary action in order to manage risks that fall in the first category. The JSF project, largely dependent as it is on developments in the US JSF programme, comes with a large number of risks (such as budget increases and delays) over which the Dutch government has no control. The government stipulated in the policy document entitled *In het belang van Nederland* ('In the interests of the Netherlands') that certain contingency reserves should be set aside: the arrangement was that 10% of the investment budget and 10% of the operating budget should be allocated for the containment of risks.

Review the size of contingency reserves

Every year, the Ministry of Defence analyses expenditure items relating to the JSF project that together account for 95% of the aggregate level of expenditure. A disparate team of experts is formed for each individual item, whose task it is to examine the uncertainties that are capable of leading to either underexpenditure or overexpenditure on the item in question. The team of experts does it best first to quantify the degree of uncertainty as accurately as possible and then to set both a minimum and a maximum degree of risk in relation to each item. The Ministry of Defence uses probability theory to estimate, with a given degree of certainty, the financial impact of the risk and hence whether the contingency reserve is large enough to accommodate it.

This approach means that the type of risk analysis and risk management undertaken in relation to the JSF project is considerably more sophisticated than in relation to other, comparable defence materiel projects, whether current or future. The 'JSF method' could also be applied to these projects.

8. Not all dollars are equal

The Minister of Defence regularly buys materiel in currencies other than the euro – such as the US dollar. As a result, defence procurement projects are exposed to currency risk, i.e. the risk associated with fluctuations in exchange rates.

When the Netherlands bought its fleet of F-16s in the 1970s, it was also a partner in an international programme the members of which included the US, Belgium, Denmark and Norway. As part of the programme, special measures were adopted in order to mitigate the currency risk. One of these was the creation of a 'currency clearing house' for balancing out (netting) exchange rate differences.

A currency clearing house for the F-16 project

The idea behind the currency clearing house was to prevent government bodies and industrial companies involved in the F-16 project from becoming exposed to unintended exchange rate fluctuations, i.e. currency gains and losses. In a nutshell, the five member countries were required to pay invoices in all five national currencies, in accordance with a set ratio depending on the number of aircraft that each country was committed to buying. Thus, the Netherlands paid around two-thirds of its invoices in US dollars and the remainder in European currencies.

Accordingly, the MoUs for the JSF contain a clause committing the US and the other partners in the JSF programme to work out together how best to contain the currency risk.[24] It would seem that this clause has not to date been put into effect, despite the fact that the nine partner countries work with eight different currencies.

In 2016, the value of the US dollar had risen to such an extent against the euro that the level of investment estimated by the Ministry of Defence for the JSF was almost € 0.5 billion higher than the target set.[25]

Currency swaps

In the policy document entitled *In het belang van Nederland* ('In the interests of the Netherlands'), the government stipulated that the contingency reserves (see lesson no. 7) set aside in the budgets for the JSF should not be used as a hedge against the currency risk.[26] The idea was that the Minister of Defence would use forward exchange contracts as hedges against the currency risk. Under a forward exchange contract, also known as a 'currency swap', a person or organisation agrees to buy US dollars on a future date at a pre-set rate of exchange. In theory, this means there is no currency risk.

Forward exchange contracts subject to Ministry of Finance rules on financial prudence

In a currency swap, a party buys dollars at the prevailing rate of exchange, for use at a later date. Because a price known as a premium has to be paid for currency swaps, such contracts are in fact a form of insurance. A rise in the exchange rate does not pose a problem because the requisite dollars have already been bought. A lower exchange rate, on the other hand, means that the holder of the contract has paid the premium for nothing. It would have been cheaper to pay with newly obtained dollars.
Under the decree on legal transactions under private law, ministries are entitled to enter into currency swaps only through the agency of the Dutch central bank and in accordance with the rules on financial prudence laid down by the Ministry of Finance. These restrictions are intended to prevent any undesirable form of speculation. In principle, currency swaps are concluded only if both the payment date and the size of the payment are known in advance. A further requirement is that the value of the underlying obligation must exceed a given threshold. For this reason, the practice to date has been to use currency swaps only once the relevant obligation has arisen and has been recorded in a ministry's accounts.

In our letter of 19 January 2016 to the Dutch Lower House,[27] we underlined the usefulness of currency swaps. At the same time, however, we pointed out that they are only a partial hedge against currency risks. There are two reasons for this.
First, in accordance with the rules on financial prudence, the government may enter into currency swaps only once an obligation has been recorded in its accounts. This is done at the time when a legal obligation arises. However, the obligations relating to the JSF project do not all arise at the same time. Instead, they are incurred separately for each individual order and, in some cases, for individual items as part of an order. This means that each currency swap covers only a relatively small proportion of the total amount due. The currency risk in relation to the remaining amount continues to exist.

Second, the Minister of Defence has made clear that, in accordance with the rules on financial prudence, she routinely arranges a currency swap within seven days of the date on which the obligation in question arises. However, the dollar exchange rate may well be unfavourable precisely at that time. Although a forward exchange contract offers both financial security and protection against the rate of exchange becoming even more unfavourable, it cannot prevent exchange rate fluctuations from pushing up expenditure on the JSF higher than the target set, whether in the current or a future government's term of office.

In our letter, we drew the attention of the Lower House to this risk. We also suggested that the Minister could provide parliament with clearer and more explicit information on the financial impact of exchange rate fluctuations.

For a number of years now, the government has sought to protect the Ministry of Defence budget from this particular risk. There are no simple solutions here, as any action can easily affect the government's budget policy. The government nevertheless still has opportunities to work within the framework of budget policy to find ways of making ministerial budgets (and not just the Ministry of Defence budget) more shock-resistant.

3.5 Phase E of the DMP: evaluation

9. Evaluate major projects

Both the previous and the new version of the DMP state that large, complex projects need to be evaluated in what is known as phase E (evaluation). According to the brochure entitled *DMP bij de tijd* ('A modern DMP'),[28] the Minister of Defence evaluates projects costing € 250 million or more, as well as projects that are particularly complex and come with certain operational risks. The brochure states that projects designated by parliament as 'major projects' should always be evaluated.
When the Minister evaluates a project, he or she looks at such aspects as its relationship with other projects, international cooperation, political sensitivity, the commercial aspects, the cost of the project and the level of public interest. The brochure states that the Central Government Audit Service examines the quality and completeness of the information contained in the evaluation report. The Minister of Defence informs parliament in writing about the findings of the Central Government Audit Service's audit of the project evaluation report.

Unfortunately, the Minister of Defence has not consistently evaluated all major projects. For example, the project for the procurement of the Karel Doorman, a *joint support ship*, was not evaluated. Yet an evaluation is an ideal time for learning from past experiences. For this reason, we regard phase E of the DMP as being a vitally important means of keeping major defence procurement projects under control.

3.6 Generic lessons

This chapter concludes with two lessons that apply to all project phases.

10. Organise effective supervision

The experiences with both the F-16 and the JSF show that effective supervision is always needed in projects involving the purchase of defence materiel. We are referring in this

connection to supervision exercised both by the ministry itself and by the audit services. Because military procurement projects are subject to special security regimes, they automatically come without the routine checks and balances built into purchases made on the open market. Sourcing the materiel in question from a foreign country may well involve complex financial and other procedures, as well as differences vis-à-vis the usual administrative procedures. In our report entitled *Financiële processen JSF* ('The financial processes relating to the JSF programme'), we showed that information-sharing, even among allies, is not common practice in international projects.[29]
Against this background, it is essential that the international agreements made in relation to defence materiel projects should make adequate provision for the appropriate organisations to be given access to information and to be allowed to perform checks. This is in the interests not just of the government and parliament, but also of taxpayers.

11. Keep an eye on the broader picture

Defence materiel is purchased under a private contract for which parliamentary assent is not required and for which the Minister bears political responsibility. Nevertheless, members of parliament must be able to form an opinion in advance on the policy leading up to the purchase. The five phases of the DMP provide them with the information they need for this purpose. For example, parliament needs to decide how the government reached its final decision on which equipment to procure, on the basis of the analysis of requirements. Parliament also needs to be able to assess the financial plans and how the Minister is intending to budget for the cost.

In our letter of 22 May 2013 to the Dutch House of Representatives on the House's information status in relation to the replacement of the F-16,[30] we wrote that there were gaps in the information provided to the House on key aspects of this major project when set against the reporting requirements that the House had specifically formulated. The main reason for this was that the government systematically put off its answers to the House's questions to a later stage of the DMP.

At the same time, members of parliament have asked a vast number of detailed questions about the JSF project over the years. According to the Ministry of Defence, 5,052 parliamentary questions had been asked by the end of 2018. Parliamentarians questioned the Minister, for example, on the number of lines of software in the JSF,[31] on problems concerning the pilot's helmet,[32] the cost of the 20-strong maintenance crew, etc. In many cases, the technical aspects on which questions were asked by members of parliament

were well beyond the Minister's control. Resources were needed to answer the questions, which therefore had the effect of raising the Ministry's costs (at a time when the Ministry was being asked to make economies).

Similarly, there has been a gradual increase over the years in the amount of detailed information contained in the progress reports submitted to parliament by the Minister. The Central Government Audit Service, which the Dutch House of Representatives asks to audit this information, has repeatedly pointed out in its audit reports that the progress reports are growing more detailed by the year and that this has had the effect of raising the burden placed on government auditors. The Central Government Audit Service has urged the government in its audit reports to review the reporting arrangements between the Minister and the House of Representatives.[33]

At the same time, it is of course true that the devil is in the detail. In other words, paying attention to details is part and parcel of a parliamentarian's work and it is up to every member of parliament to decide which questions he or she wishes the Minister to answer. Nonetheless, a vast mass of detail may well make it difficult to see the proverbial wood for the trees. That is why we would say that there is also a lesson to be learned here: it pays to keep an eye on the broader picture.

4 Epilogue: keeping large defence procurement projects under control

The government governs and parliament monitors the government. This also applies to the procurement of defence materiel. There is no difference in principle between buying office equipment and buying large-scale military equipment. To enable the armed forces to perform their public duty, the Minister of Defence buys materiel using funds allocated by parliament in the budget. The Minister subsequently accounts each year for the government's defence spending in the ministry's annual report.

In practice, the selection process involved in placing large-scale military orders is a cat-and-mouse game played out among the branches of the armed forces, government ministries, parliament and industrial firms. Political, military and economic arguments are exchanged, and their relative weight changes with the passing of time. This was the conclusion we drew in 2002, in a report entitled *Een vlucht door de tijd* ('A flight through time') on the process of choosing a successor to the Starfighter.[34] The same applied to the purchase of the Apache attack helicopter and other weapon systems.

And indeed, the same was true – to an even greater degree – of the decision to buy the JSF. Whereas the political decision-making process on the purchase of the F-16 took less than a year to complete, the decision to replace the fleet of F-16s with JSFs was 17 years in the making. The Minister of Defence undertook two separate comparisons of alternative options for the replacement of the F-16, viz. in 2002 and 2008. And in 2009, a number of fractions in the Dutch House of Representatives even requested a third comparison of potential candidates.

In this light, it is worth stopping to consider why the process has been so time-consuming. If we look again at the time line for the decision-making process on the JSF (see Figure 1 in chapter 2), we see that there were in fact three different processes going on at the same time. First, there is the replacement of the F-16. The assumption was that this would follow the orderly sequence of events set out in the DMP.
Then there is the international JSF programme. The involvement of the Dutch Ministry of Defence in this US programme was largely a function of the speed at which the programme progressed and the US political decision-making process. The various stages of development and production followed one another in line with the timetable of events in the US. At each

point, the Dutch government was invited to contribute. The only choice available to the government was either to join the bandwagon or to watch it go by.
Third, there is the political process. In the case of the F-16, the Netherlands did not join the programme until the production stage, at which point the Dutch government immediately placed an order. In the case of the JSF, the Dutch government had already decided to sign up to the programme before the development stage. In fact, there was no need to actually place an order until many years later on in the JSF programme, which meant that there was a long period during which the decision could be put off. Eight Dutch governments all consisting of different coalitions took office during the course of the programme, i.e. from 1996 to the end of 2013. The installation of each new government led to a reappraisal of this massive investment in the light of other public expenditure and changing social circumstances. And each time, there was new information, for example generated by a fresh comparison of alternatives, to shed new light on the situation. The DMP, with its logical sequence of steps, was regularly broken off, put back or rearranged. In the end, the government reached a decision in 2013 (announced in a policy document entitled *In the interests of the Netherlands*)[35] that was supported by a parliamentary majority.

The combination of these three processes proved a volatile mixture in the course of reaching a decision on the JSF. Many of the above elements are likely to recur in the 30 new defence procurement projects that the Ministry of Defence is planning to launch during the current government's term of office. If parliament wishes to keep these projects under control, it will have to be keenly aware – from the very outset and at every new step – of how much latitude is actually still available to it. This applies particularly to international projects. It is important to bear in mind that every political choice comes with financial consequences. Whether it is a decision to move forward or take a step back, or indeed to stand still, every decision costs money – expenditure that needs to justified.

Appendix 1 Guidelines for reporting to parliament

Budget and accountability cycle

As part of the budget and accountability cycle, the Minister informs parliament about all forms of income and expenditure, including the purchase of defence materiel. This information does not generally go into the details of individual projects, however. Together with the draft budget for the coming year, parliament is sent a document known as a List of Materiel Projects. The List of Materiel Projects provides, for each weapon system, standardised information (generally no more than one page) on investments in current defence materiel projects. This information includes a time line and basic financial information.

The Defence Materiel Process (DMP)

The DMP contains regulations drawn up by the Minister of Defence on the purchase of military equipment, IT systems and infrastructure for projects costing in excess of € 25 million. The Minister amended the DMP in 2016.

The DMP contains rules both on procedures followed at the Ministry of Defence itself and on the way in which the Minister is obliged to inform parliament about the purchase. The DMP regards the purchase of defence materiel as a five-stage process. Each stage concludes with the publication of a summary document. Based on this document, the Minister then decides whether to allow the project in question to proceed to the following stage. The Minister of Defence (or the State Secretary) also writes a letter containing information for parliament at the end of each stage. The Dutch House of Representatives generally discusses the contents of this letter with the Minister (or the State Secretary, as the case may be).

The DMP during the period up to 2016

The situation up to 2016 was that projects subject to the DMP went through five distinct stages (see Figure 3):

- analysis of requirements (phase A);
- preliminary study (phase B);
- study (phase C);
- preparations for procurement (phase D) and implementation;
- evaluation (phase E).

Phase E applied only to projects costing at least € 250 million or projects regarded as being particularly complex or associated with a high level of risk. The DMP states that all projects designated as 'major projects' by parliament should be evaluated.

The DMP during up to 2016

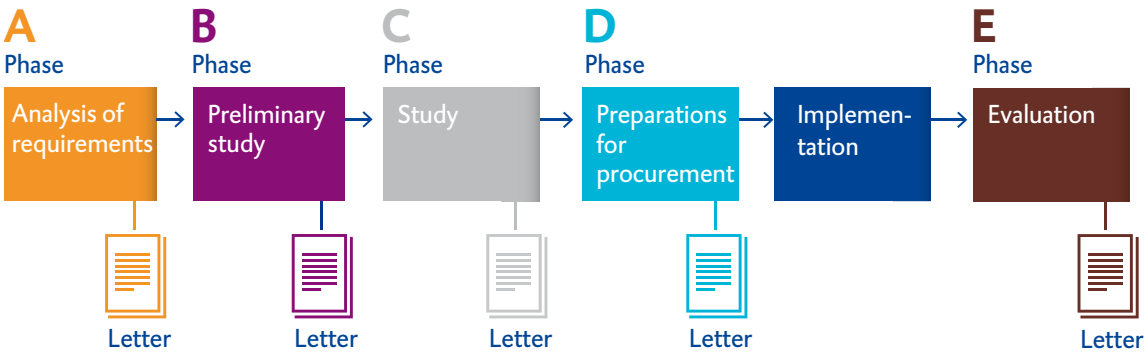


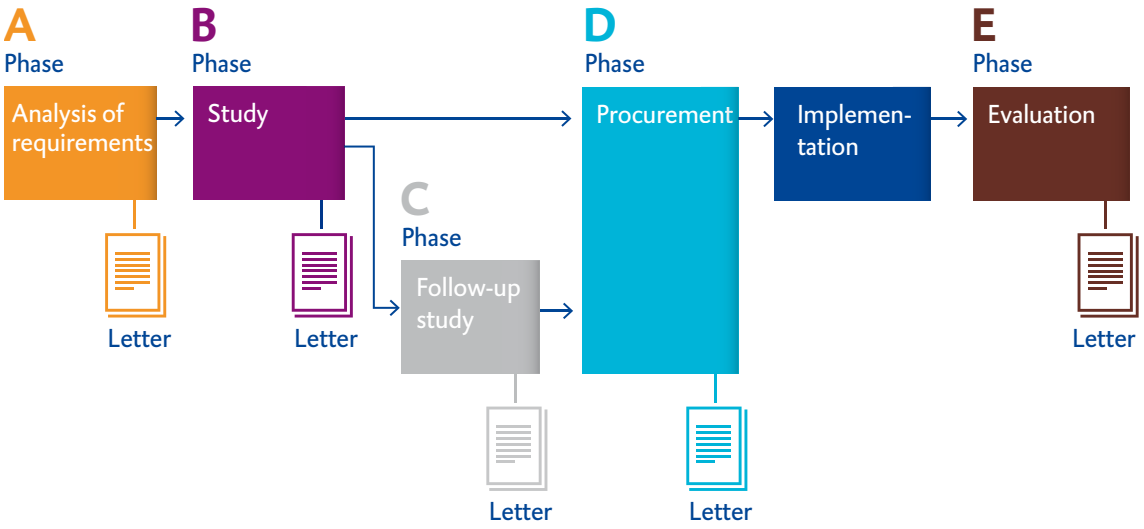
Figure 3 *DMP during the period up to 2016*

The project for the replacement of the F-16 fell under this version of the DMP. Parliament received the A letter in April 1999 and the combined B & C letter in February 2002. The Minister of Defence sent the D letter to parliament in December 2014.

The DMP since 2016

The DMP was revised in 2016. The new version applies to all future procurement projects undertaken by the Ministry of Defence. The names of the phases have been altered, the main difference between the old and new versions being in relation to phase C. The new-look DMP includes a phase C only if it is assumed that the new materiel cannot be bought off-the-shelf, but will have to be specially developed (see Figure 4).

The DMP since 2016



Figuur 4 *DMP vanaf 2016*

As was the case with the old DMP, the new DMP also includes an evaluation stage (phase E) for large, complex projects.

The JSF programme

Stages of US weapon development programmes

US weapon development programmes are structured in the same way. The various phases are fixed and the programme moves on to the next stage only once the previous stage has been concluded. Certain aspects of this procedure have been laid down in the form of statutory regulations. The various phases are shown in Figure 5.

The standard weapon development process in the US

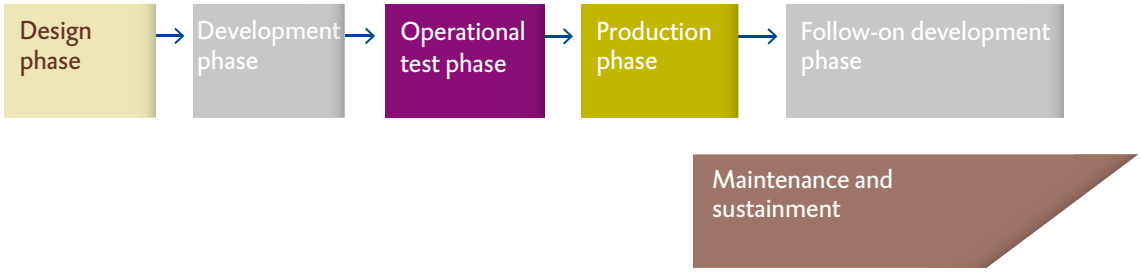


Figure 5 *Stages in a US weapon development programme*

There are six phases:

- the *design phase*, in which a manufacturing company comes up with an idea for a new weapon system;
- the *development phase*, in which the manufacturer fully develops the weapon system in question;
- the *operational test phase*, in which the US Department of Defense tests the weapon system's operational capacity;
- the *production phase*, in which the manufacturer produces the weapon and sells it to the US government;
- the *maintenance and sustainment phase*, for which the US armed forces (or those of the country purchasing the materiel) are responsible;
- the *follow-on development* of the materiel in question, in which the US *Department of Defense* asks the manufacturer to refine and perfect the materiel. This stage may last a number of decades, involving the production of a series of new versions each one of which is required to pass through the previous stages of development, testing and production.

Differences with JSF programme

Although the JSF programme consists of the same stages as those described above, it nonetheless differs from other projects (see Figure 6).

The JSF weapon development process

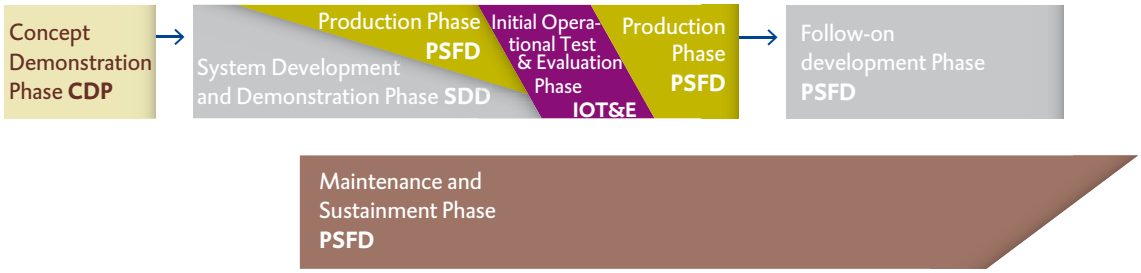


Figure 6 *The phases of the JSF programme*

The first difference is that, in the JSF programme, production already starts during the development phase. This is known as 'concurrency'. The advantage is that aircraft come into production even if the development phase lasts longer than planned. This does mean, though, that aircraft produced early on in the process need to be adjusted ('retrofitted') to bring them into line with development work later on in the process. The division between the operational test phase and the development and production phases is also less strict than in the standard weapon development process.

The second difference is that maintenance and sustainment are performed not by the armed forces themselves, but by the manufacturer acting on the instructions of the JSF Program Office. The manufacturer creates a global maintenance network to this end. This means that the countries purchasing the JSF (including the US) acquire a comprehensive package including maintenance and sustainment throughout the entire life cycle of the JSF. This sustainment model is still under development.

MoUs

A memorandum of understanding (MoU) is signed for each phase of the JSF programme. An MoU sets out the arrangements made by a participating country on aspects such as cooperation and financial contributions. There are four MoUs:

- the CDP MoU for the Concept Demonstration Phase;
- the SDD MoU for the System Development and Demonstration Phase;
- the IOT&E MoU for the Initial Operational Test and Evaluation Phase;
- the PSFD MoU for the Production, Sustainment and Follow-on Development Phase.

The Dutch government has signed all four MoUs. On each occasion, the signing of an MoU formed a milestone at which parliament was informed about the status of the JSF project. Under the terms of the MoUs, the national audit offices in the participating countries are empowered to audit the JSF programme. These audits are an additional source of information for national parliaments.

Regulations on Major Projects

The Lower House of the Dutch parliament, referred to here as the Dutch House of Representatives, has adopted its own Regulations on Major Projects, under which the House is entitled to designate a project as being a 'major project'. The Minister is required to present the House with regular progress reports on any project that has been classified as a major project. The House decides what sort of information the Minister should provide.

Under the Regulations on Major Projects, the House is also entitled to make more detailed reporting arrangements with the responsible minister. The nature of these arrangements depends on the stage of development reached by the project.

On 17 June 1999, the Dutch House of Representatives designated the project for the replacement of the F-16 as a 'major project'. In a series of three special 'Memoranda setting out the Principles underlying the Major Project for the Replacement of the F-16', the House of Representatives made more detailed reporting arrangements with the Minister of Defence, in 1999, 2009 and 2014, about the frequency with which it is to be presented with progress reports and the type of information these should contain.

The progress reports on the project for the replacement of the F-16 and the procurement of the F-35 were signed jointly by the Minister of Defence and the Minister of Economic Affairs (who since 2017 has been known as the Minister of Economic Affairs and Climate Policy). Until 2014, the ministers were required to submit a progress report at least once a year. The frequency was raised to twice a year in 2014. In 2018, the House of Representatives subsequently gave its approval to a proposal from the Minister of Defence to reduce the frequency to once a year.

The Regulations on Major Projects are a tool that the Dutch House of Representatives can use to gain a grip on big procurement projects. However, they are a powerful medicine used only on a minority of materiel procurement projects. The Regulations give the House

of Representatives access to two key means of ensuring that it receives good-quality information:

- The Minister is required to enclose an 'assurance report' from the Central Government Audit Service with every progress report. In issuing this report, the Central Government Audit Service provides a guarantee to the House of Representatives that the Minister's report is reliable.
- Under article 14 of the Regulations, the relevant Standing Committee is entitled to ask the Minister to amend a progress report. If the committee takes the view that the information supplied by the Minister is inadequate or of poor quality, the Minister has seven working days in which to supply the missing information or improve the quality of the information supplied, as the case may be.

On only one occasion during the course of the JSF project has the House of Representatives made use of its power to reject a progress report and to require the Minister to submit an improved version. This was on 3 April 2009, when the Standing Committees on Defence, Economic Affairs and Finance and the Committee for Central Government Expenditure rejected the 2008 annual report on the project for the replacement of the F-16 (Parliamentary Paper 26 488, no. 159 of 27 March 2009) and asked to be supplied with further information on the costs. The State Secretary for Defence provided the House with the information requested 12 days later.[36]

Appendix 2 Key terms explained

JSF programme and JSF project

The terms 'JSF programme' and 'JSF project' are both used in this report. They do not mean the same thing. The JSF programme is the US programme for the development and production of the Joint Strike Fighter. As international partners are free to sign up to this programme, it is also referred to as the 'international JSF programme'. The Netherlands is one of the countries participating in this programme and has signed all the relevant cooperation agreements (MoUs).

The JSF project, on the other hand, is a Dutch project involving both participation in the US programme and the procurement of the JSF. The Minister of Defence initially referred to the project as the 'project for the replacement of the F-16', but since the government decided that the JSF (or the F-35, as it is also known) should be the successor to the F-16, the Minister has referred to the project as the 'project for the procurement of the F-35'.

JSF and F-35

This report concerns a new fighter aircraft to replace the F-16. This new aircraft is known both as the Joint Strike Fighter (JSF) and as the Lockheed Martin F-35 Lightning II (F-35). The two names, i.e. JSF and F-35, are used interchangeably, both in the Netherlands and in other countries. In the US, for example, the 'JSF Program Office' is responsible for the implementation of the 'JSF Program'. Although, for a long time, the Dutch Ministry of Defence used the terms 'JSF' and 'F-35' interchangeably, it opted for the term 'F-35' in 2013. For our part, we first started auditing the replacement of the F-16 in 2005 and have consistently used the term 'JSF' throughout this long series of audits. We propose to continue to do so in the future, so as to ensure that the terminology used in our audit reports remains consistent.

Appendix 3 Ministry of Defence programme of investments

According to the Ministry of Defence's programme of investments, the following 30 procurement projects are due to be launched during the current government's term of office.

Ministry of Defence programme of investments

A Letter B Letter D Letter > Commisioned

	Name of project	Project cost in €	2018	2019	2020	2021	2022	2023	2024	2025
	Maritime									
1.	Replacement of submarine capacity	> 2.5 billlion		B		D				
2.	Replacement of multi-purpose frigates	> 2.5 billiion	A	B	D				>	>
3.	Replacement of minesweepers	1 - 2.5 billion	A	D					>	>
4.	Procurement of combat support ship	250 - 1,000 million	A	B/D		>				
5.	Procurement of Sea Sparrow missile system	250 - 1,000 million	A	B	D					
6.	Replacement of all-terrain vehicle	250 - 1,000 million		A		B	D		>	>
7.	Repl. of guns on air-defence and command frigates	100 - 250 million	A	B/D	>	>	>	>		
8.	Procurement torpedo defence system	100 - 250 million	A	B	D	>	>	>	>	>
9.	Replacement of Harpoon missile system	100 - 250 million	A	B	D			>	>	>
10.	Replacement of Goalkeeper	100 - 250 million	A	B	D			>	>	>
11.	Replacement of medum-sized landing craft	100 - 250 million			A	B	D		>	>
12.	Repl. of HMS Mercuur and hydrographic survey craft	100 - 250 million			A	B	D			
13.	Addition to SM2-IIA	25 - 100 million		A	B/D	>	>			
14.	Participation in development of SM2-IIIA	25 - 100 million		A	B/D	>	>			
15.	Replacement of mobile depth sonar	25 - 100 million			B	D	>			
16.	Repl. of fast-raiding, interception and special forces craft	25 - 100 million			B	D			>	>
17.	Repl.of HMS Van Kinsbergen (training vessel)	25 - 100 million			A		B/D		>	>
	Land									
18.	Replacement of switch-back systems	250 - 1,000 million		A	B	D	>	>	>	>
19.	Replacement of very short-range air-defence system	100 - 250 million		A	B	D	>	>	>	>
20.	Replacement of area access denial	25 - 100 million	A	B	D	>			>	>
21.	Replacement of CBRN Fuchs vehicle	25 - 100 million	A	B	D	>	>			
22.	Replacement of folding bridge	25 - 100 million		A	B/D	>	>			
23.	Replacement of tractor-trailer combinations	25 - 100 million		A	B	D	>	>		
24.	Replacement of breakdown lorries	25 - 100 million		A	B	D	>	>		
25.	Procurement of CBRN command & control	25 - 100 million		A	B	D	>	>		
26.	Procurement of CBRN medical installations	25 - 100 million		A	B	D	>	>		
27.	Replacement of light indirect-fire systems	25 - 100 million		A	B	D	>	>	>	>
	Air									
28.	Apache remanufacture	250 - 1,000 million	AD				>	>	>	
29.	Helicopter simulator	25 - 100 million	A	B	D		>			
30.	Replacement of Gulfstream	25 - 100 million			A	B/D	>			

Figure 7 *Procurement projects planned during the current government's term of office.*
Source: Defence White Paper: programme of investments[37]

Explanatory note

Figure 7 shows those procurement projects that are scheduled to start during the current government's term of office. The list of selected projects does not include midlife upgrades or other investments designed to extend the service life of existing weapon systems, purchases of ammunition and structural investments projects (i.e. investments in infra-structure, IT services and academic research).
We have included project no. 1 (for the replacement of submarine capacity) in the list as the Ministry of Defence still needs to move further down the decision-making process (by taking a series of steps covered by a number of the lessons learned described in this report). The A letter for this project was published in 2016.
A list of abbreviations is given in Appendix 4.

Appendix 4 List of abbreviations

AOR	Auxiliary oiler replenishment
AS	Aero Spatiale
CBRN	Chemical, biological, radiological and nuclear
CDP	Concept Demonstration Phase
CH	Cargo helicopter
CPB	Netherlands Bureau for Economic Policy Analysis
VC	Combat vehicle
DMP	Defence Materiel Process
EU	European Union
JSF	Joint Strike Fighter
IOT&E	Initial Operational Test and Evaluation
MoU	Memorandum of understanding
NATO	North Atlantic Treaty Organisation
PSFD	Production, Sustainment and Follow-on Development
SDD	System development and Demonstration
SM2-IIIA	Standard missile 2 Block IIIA
US	United States of America

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Appendix 6 Notes

1. Netherlands Court of Audit (1998).
2. Ministry of Defence (1996)
3. The other partners are Australia, Canada, Denmark, Italy, Norway, Turkey and the United Kingdom.
4. In 2013 prices.
5. See Appendix 2 for an explanation of the terminology used.
6. See Appendix 1.
7. See Appendix 1.
8. Ministry of Defence (2000).
9. See Netherlands Court of Audit (1985).
10. See Appendix 1 for a description of the DMP.
11. Netherlands Court of Audit (2016a).
12. Netherlands Court of Audit (2016a).
13. Netherlands Bureau for Economic Policy Analysis (2001) and Netherlands Bureau for Economic Policy Analysis (2009).
14. SEO (2012).
15. Netherlands Court of Audit (1985).
16. Netherlands Court of Audit (1985).
17. In 1975 prices.
18. Netherlands Court of Audit (2002).
19. GAO (2005); in 2002 prices.
20. Ministry of Defence and the Ministry of Economic Affairs and Climate Policy (2018). In 2013 and 2018 prices respectively.]
21. Appendix B to the Financial Review of Weapon Systems looks 15 years ahead into the future. This appendix was updated in the draft budgets for the years 2015–2018. It was no longer included in the draft budget for 2019.
22. The Minister of Defence reported in the 19th progress report (Ministry of Defence and Ministry of Economic Affairs and Climate Policy (2018a)) that these financial guidelines had been scrapped. She did not explain exactly which parts of the guidelines were affected and what impact this would have on the project.
23. Netherlands Court of Audit (2013b).
24. For example, the MoU on the PSFD, section V, art. 5.1.
25. Planning dollar exchange rate for 2016; 2016 prices.

26. The Minister of Defence reported in the 19th progress report on the procurement of the F-35 (Ministry of Defence and Ministry of Economic Affairs and Climate Policy (2018a)) that the financial guidelines relating to the procurement of the JSF had been scrapped. It is not clear what impact this will have on the project.
27. Netherlands Court of Audit (2016b).
28. Ministry of Defence (2016a).
29. Netherlands Court of Audit (2018c).
30. Netherlands Court of Audit (2013a).
31. House of Representatives 2007–2008 session, 26 488, No. 75. Sdu (The Hague).
32. House of Representatives 2013–2014 session, 26 488, 311. Sdu (The Hague).
33. Central Government Audit Service (2017).
34. Netherlands Court of Audit (2002).
35. Ministry of Defence (2013).
36. Ministry of Defence (2009).
37. Ministry of Defence (2018).

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