

# Decision Analysis Services Ltd

## Getting Affordable Solutions How much to spend and when to spend it

SCAF - November 2012

Craig Clark

This document is Copyright ©2010 of Decision Analysis Services Ltd.  
Its contents wholly or in part shall not be communicated or copied by any means  
whatsoever to any third party, individual or organisation or government without consent  
of Decision Analysis Services Ltd.

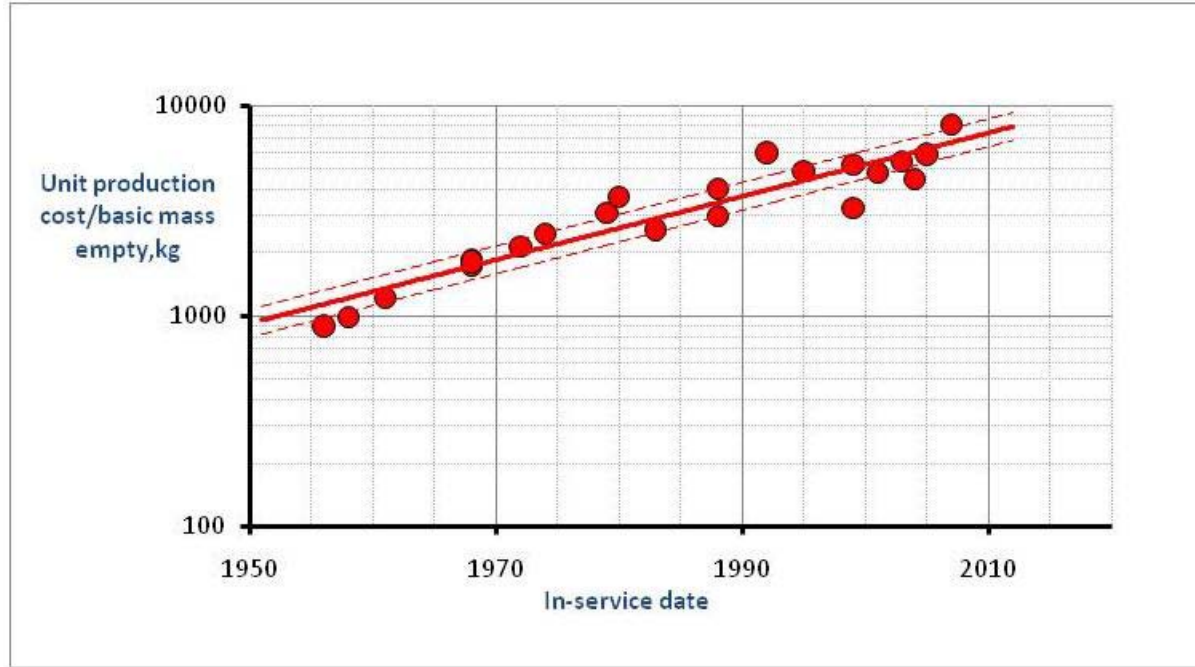
- Introduction
- Background
- How much to Spend
- When to Spend
- Conclusions
- Questions

- This paper will consider equipment acquisition affordability
- It will two views
  - Total cost of the programme (**how much**)
  - The cost profile (**when**)
- Both need to be managed realistically to enable and ensure affordable programmes
- Affordable programmes lead to affordable portfolios/defence

- Early estimates for cost and delivery dates for defence acquisition were in the main, incorrect
- There has been an issue with affordability in UK defence for a number of years
  - Looking at defence projects around the world, the average increase in actual cost versus the estimated cost at the start of development is about 40% . For estimates made earlier in a project (i.e. at the concept stage) the situation is yet worse.
  - According to the NAO report “Ministry of Defence: The Major Projects Report 2011”
    - £6.1Bn (11.4%) – Total increase in forecast costs to complete all 2011 projects since the Department approved the main investment decision.
    - £10.6Bn (11.4%) – Total increase in forecast costs since the Department approved the main investment decision for all Major Projects since 2000.
- There are many known drivers for this including the ‘conspiracy of optimism’

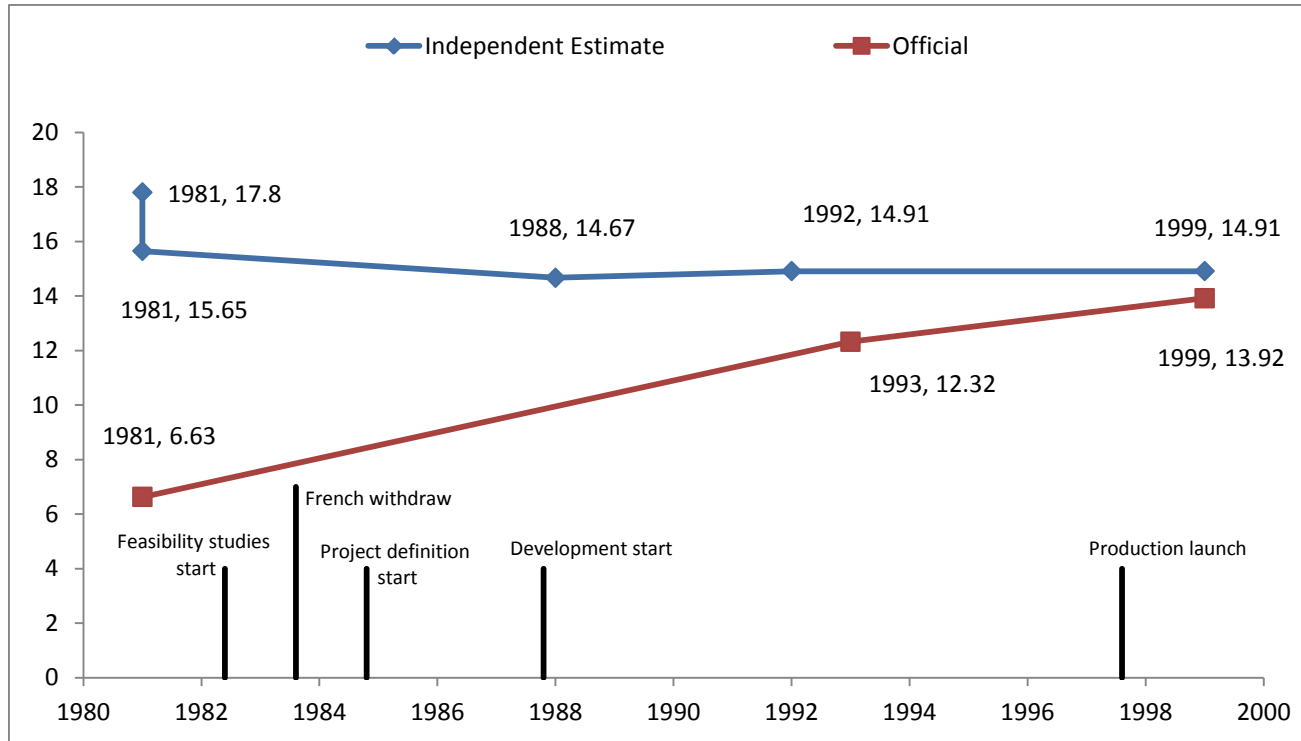
- Defence products are different from other sectors
- Leads to an enterprise that requires that latest technology
- Production volumes are small
- Changes in threat can alter requirements
- This and 'conspiracy of optimism' has caused difficulty to politicians and defence staffs globally for a number of years.
- In the UK, MoD has undertaken a number of organizational changes and planning processes, including
  - Downey (1962)
  - Smart Procurement Initiative (1998)
  - Smart Acquisition (2000)
  - Enabling Acquisition Change (2006)
  - Levene Defence Reform Group (2012)

- What the total cost of the programme should be (how much)
- Various cost analysis methods can be used
- Focus on Parametric cost methods
- Allow estimates to do be done early in the programme life where little information is known about the equipment
- Accurate enough to provide a sanity check for early forecasts
- We look at historical example and then JSF programme



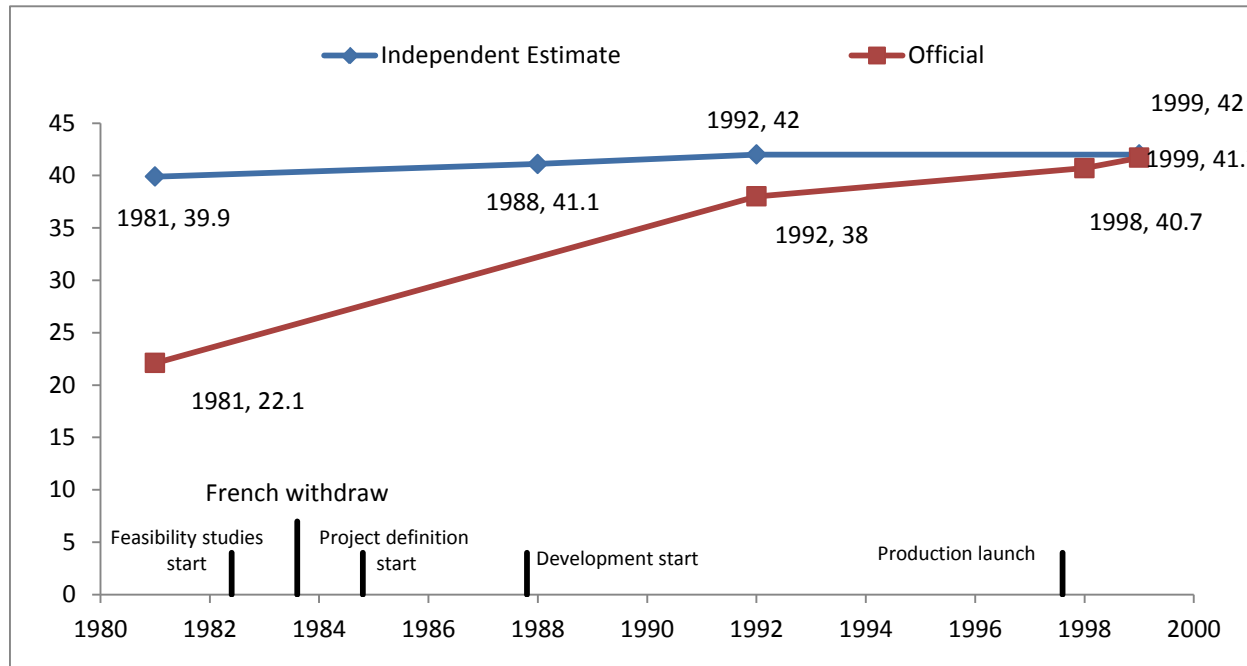
- Analysis of previous Fighter/Strike Aircraft programmes to used to determine Cost Estimating Relationships (CERs)
- The Specific Cost (unit production cost/basic mass empty) gives a measure of complexity which increases exponentially year on year

- Eurofighter Development Cost Estimates
- Sees an approximate increase of 3.6% per annum

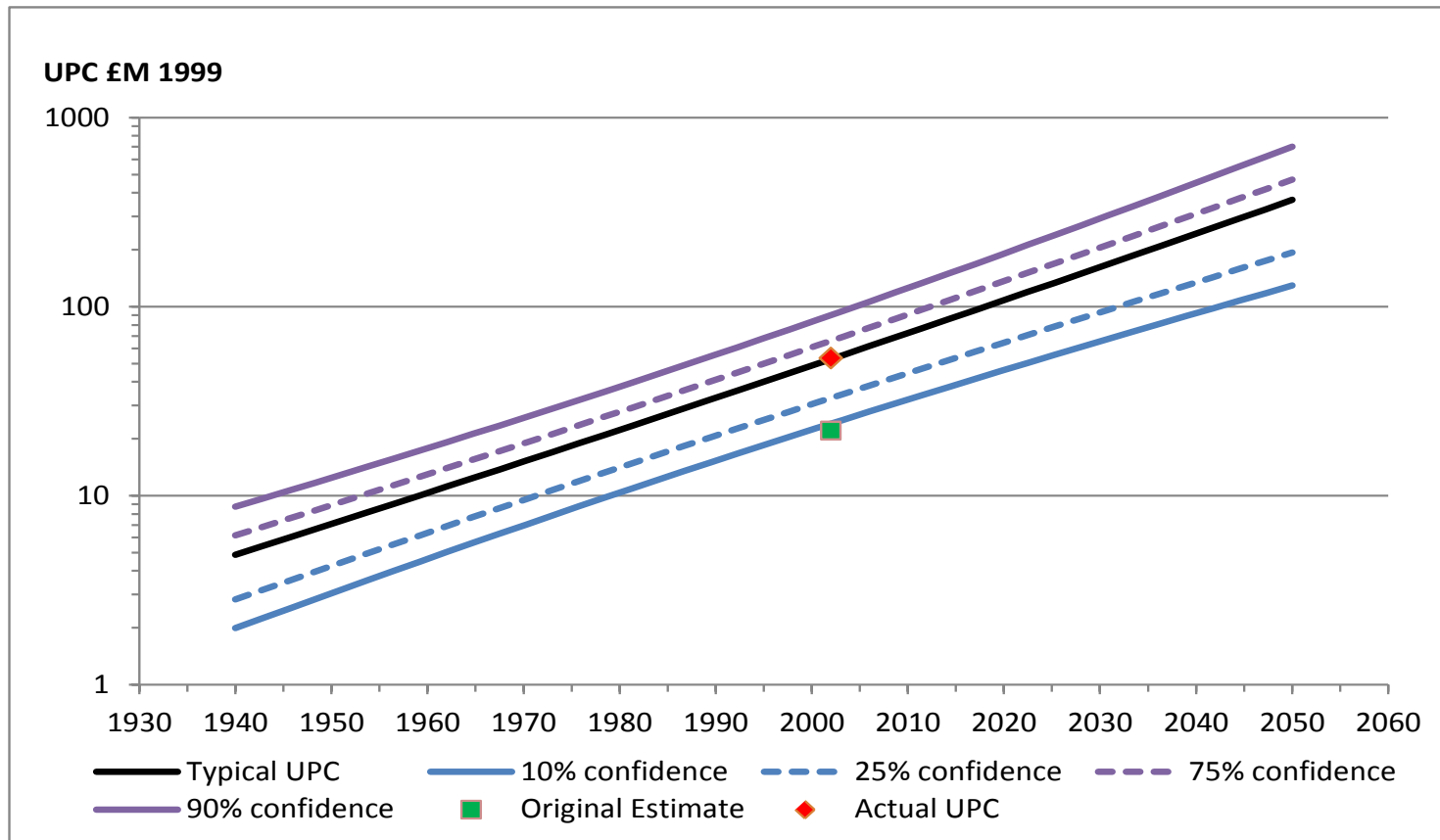




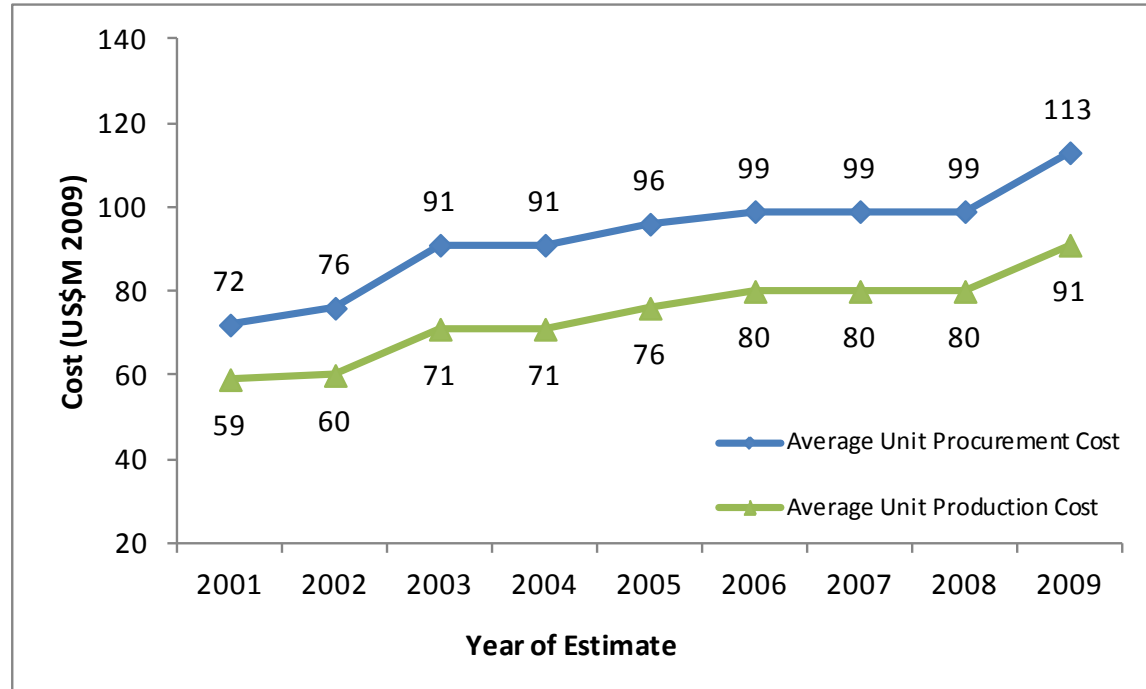
- Eurofighter Unit Production Cost Estimates
- Sees an approximate increase of 4% per annum



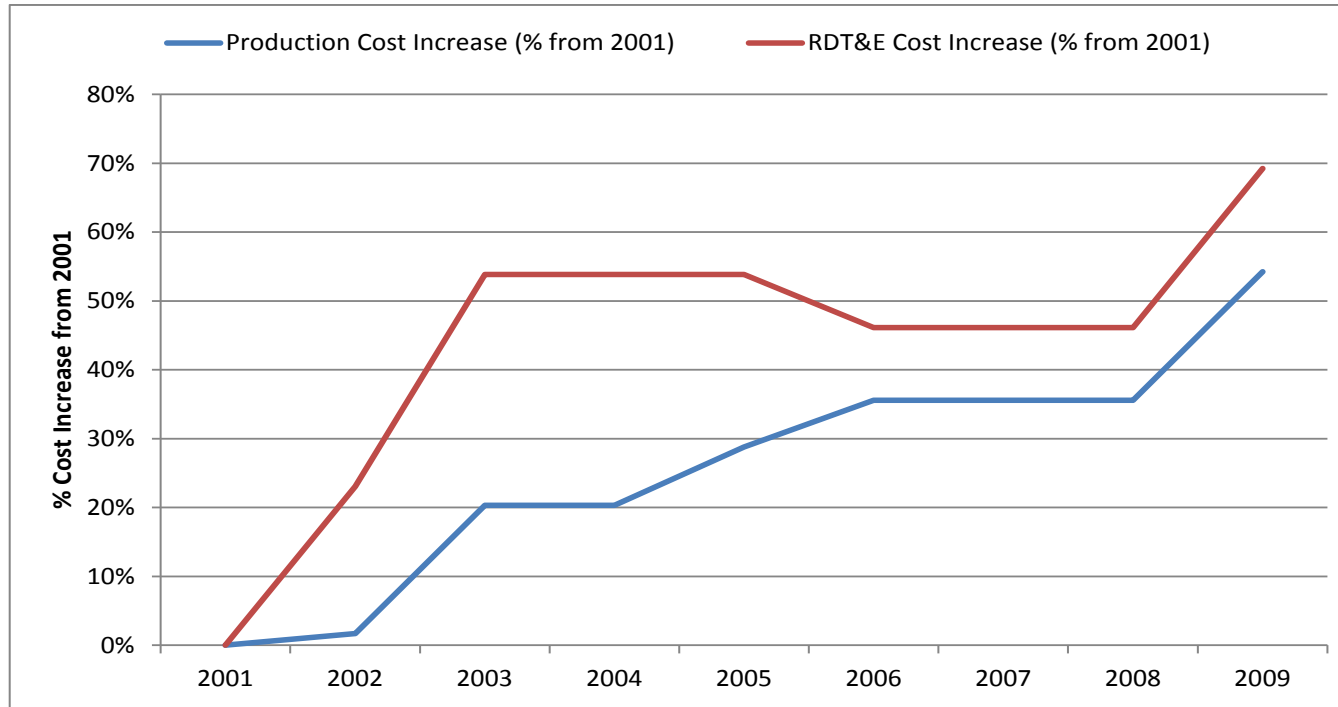
- The original estimate can be seen to be very low against the trend
- The actual cost lies on the trend line
- Analysis done using public data that would have been available at the time



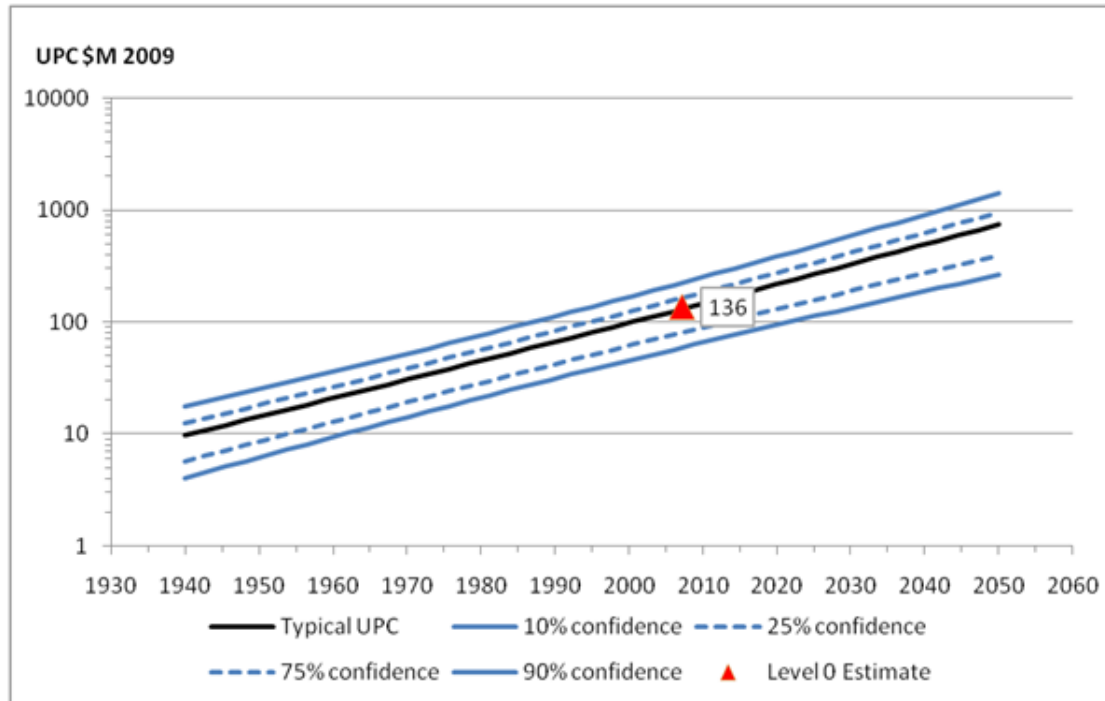
- Can the case study apply to current programme
- JSF is a very large acquisition programme
- Much publicized
- Study reviewed the Selected Acquisition Reports (SARs)
- Produced an independent estimate from public domain data



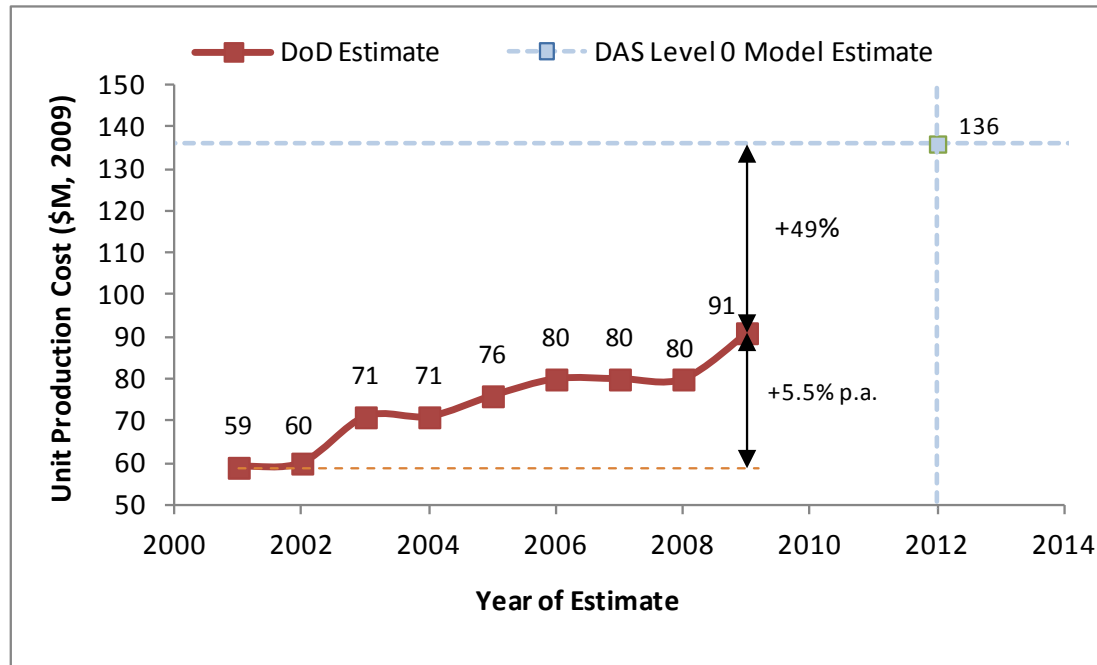
- SAR estimate for Unit procurement and Unit Production costs estimates between 2001-09
- The chart shows an approx. annual increase of 5.5-5.8%
- The estimates continue to rise each year with no sign of plateau
- When will cost increase slow down?



- RDT&E went up by approx. 55% in first 2 years
- Contributed to the first Nunn-McCurdy Breach in 2004
- Production estimate steadily rose throughout the programme
- Initial production started in 2007
- After this there has been an increase in both Development and Production estimates
- Second Nunn-McCurdy Breach



- DAS cost model used to develop independent estimate for the JSF programme
- The estimated Unit Production Cost (UPC) across the US procurement is US\$136M
- How does this compare with the official published estimates?

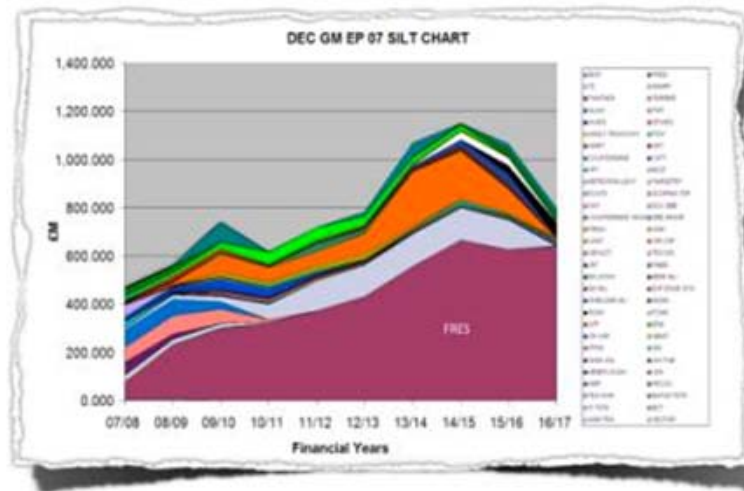
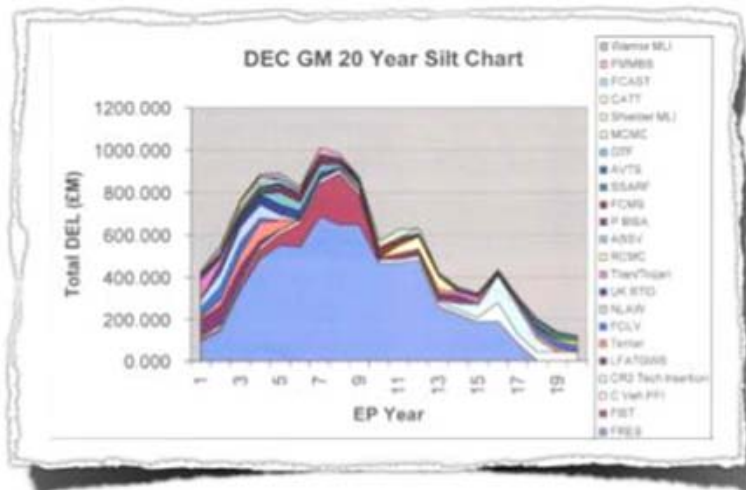


- The official estimates are increasing by 5.5% pa on average
- In order to reach the independent estimate they would need to increase by approx 20% between now and delivery of the programme
- Numbers are reducing with approx. 520 removed since 2001
- This has a compounded effect on the cost due to economies of scale and learner
- Leads to further political decisions on affordability across different countries

- Costs are increasing each year
- Capability Implications
- There has been a reduction in the number of Aircraft that will be delivered across the main partner countries (3623 ->3103)
- A number of nations have delayed signing up to the programme and have pushed the decision out for a few years
- This has a compounded effect as the full economies of scale and learner benefits cannot be realised as production quantities are reduced
- This has huge political implications

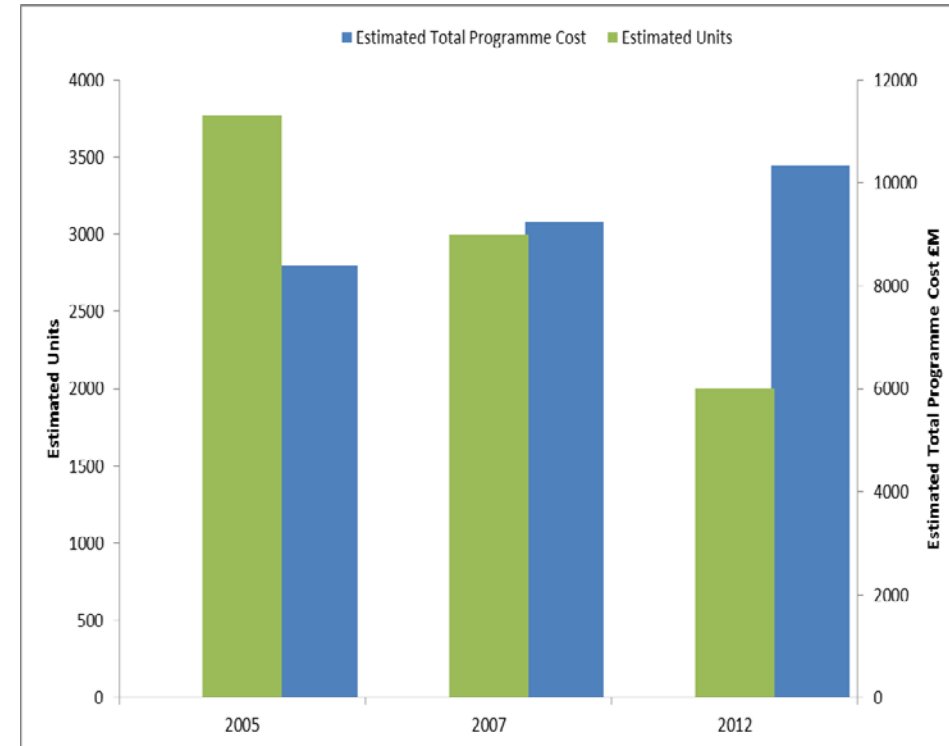
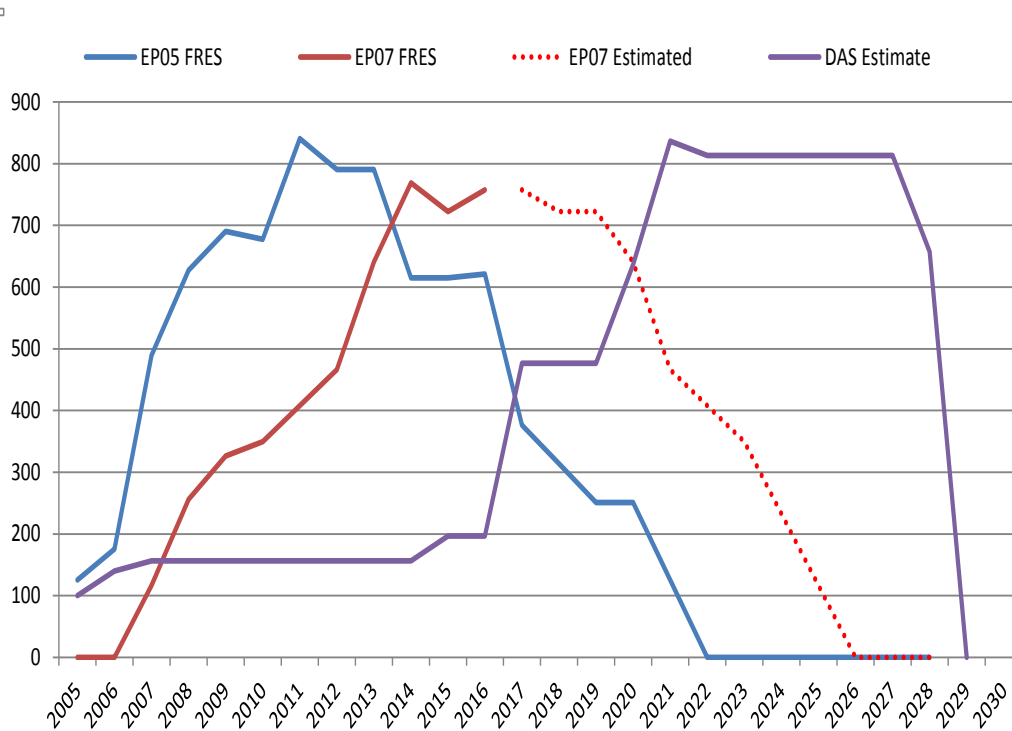


- Even if programme costs are well understood is it key to put them into the context of the wider portfolio
- Need to understand how long the project will take and what other programmes are occurring at the same time
- Project schedule overruns and cost creep have a knock on effect on the other projects within the portfolio
- Tendency to push projects to the right to achieve affordability creating a 'bow-wave' effect that is difficult to resolve



- Comparison of FRES over the years
- Presentation by MoD retrieved for FRES at various stages
- Two snapshots to illustrate profile change
- In 2005, peak spend was about now (2012)
- Bottom picture, EP07 is a much revised view
- Spend moves right in two years from 2005-2007, will it continue to?
- Has become part of the 'bow-wave' of projects shifted right to manage budget pressures

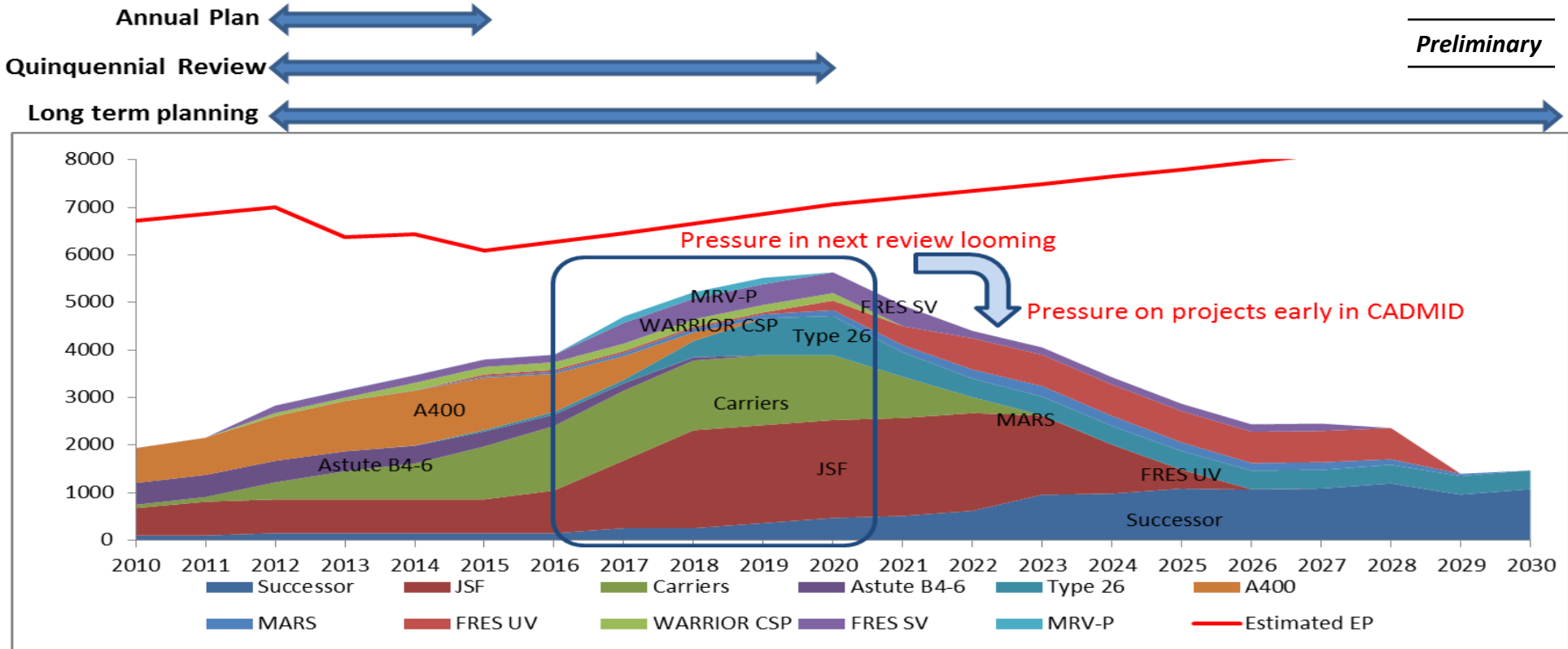
# The changes to FRES



- The FRES spend estimated from EP05, EP07 and DAS 2011 estimates are rebased to common ec's and shown above
- Stark illustration of the trajectory of FRES programme
- Total costs are increasing, driven by requirements and schedule slip
- Second chart summarises total programme costs and quantities
- Reducing numbers and spend being delayed being driven by other programmes
- Is this now realistic, are there still budget pressures?

# Current Picture - Budget pressures returning for next review?

Estimated EPP budgets for selected major programmes (£Bn 2011 e.c.)



- Selection of Major projects with estimated spend against the predicted EP funding
- EP estimate from DAS macro-economic modelling and defence spend analysis
- Other projects include Lynx, Merlin Sustainment, Puma Life Extension, Typhoon, Watchkeeper, T45, etc
- In 2019-20, projects estimated account for approx. 80% of EP spend
- FRES UV aspiration of initiation around 2019-20 places it in precarious position
- Other major projects with political equity invested and further along the CADMID cycle around same time

- Analysis has illustrated the well known systemic problems with defence acquisition
- There is a need for change in two areas
  - Fundamental change in acquisition strategy
  - Better planning models particularly at strategic level

## Strategic planning models

- Synthesising outputs from detailed models (feeder models)
- Suite of models that give enough detail to be accurate but not time consuming to run, update or maintain
- Programmes on a single view and ability to do rapid 'what-if' analysis
- Impacts of programme change

## Sources of data

- Public domain - MoD
- Public domain - international
- DAS Proprietary projects database
- DAS cost estimation toolset
- Industry consultation

## High level schedule model



*Refine* data as policy changes and acquisition decisions are committed

*Explore Rapid* what ifs and testing of overall programme

## Outputs

- How much programmes should cost
- How long they should take
- When best they occur
- What budget is available for the portfolio

