

Business Critical Models in the Ministry of Defence in 2015

1. We are publishing our business critical models¹ as part of our response to the Macpherson Review of Quality Assurance of Analytical Models. A previous list of MOD business critical models was published as part of the Macpherson Review report².

Background

2. Following the problems in the award process for the InterCity West Coast franchise by the Department of Transport, Sir Bob Kerslake and Sir Jeremy Heywood commissioned a review of the quality assurance of analytical models that inform policy across government. The review was led by Sir Nick Macpherson, Permanent Secretary at the Treasury, who published his [Review of quality assurance of government models](#) in March 2013.

How have we implemented the Macpherson Review?

3. As required by the Macpherson Review³, our governance statement must confirm that we have an appropriate quality assurance framework for analytical models. So we asked each Arm's Length Body that has one or more business-critical models to confirm their arrangements are appropriate in their annual Assurance Statement. We will publish our governance statement soon.
4. MOD has well established arrangements already. To further strengthen our processes and documentation - as well as our culture and the environment in which quality assurance takes place - we have agreed an Action Plan with the Defence Audit Committee and others. For example, we are:
 - improving our governance arrangements, for example ensuring each business-critical model has a Senior Responsible Owner
 - ensuring our processes and guidance are clear and cover quality assurance arrangements
 - promoting a pro-quality assurance culture, for example by using Modelling Champions in key organisations and, where appropriate, including quality assurance as a work objective for staff
 - promoting transparency by publishing a list of our business critical models below.

¹As suggested by the Macpherson Review, we define a model as business critical if it drives key financial and funding decisions, its essential to the achievement of our business plan, or if error could lead to serious financial, legal or reputational damage.

²<https://www.gov.uk/government/publications/review-of-quality-assurance-of-government-models>

³https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/206946/review_of_qa_of_govt_analytical_models_final_report_040313.pdf

Next steps and getting in touch

5. We are exploring ways to strengthen our Action Plan further. So we asked the Defence Scientific Advisory Council to review our implementation and give us their recommendations. We are considering their report⁴ and will make further improvements based on the findings.
6. For any questions, please contact DefStrat-Econ-Gen-PC-1@mod.uk or DefStrat-Econ-Gen-AE-3@mod.uk

List of Business Critical Models in Defence

-	<u>Name</u>	<u>Type</u>	<u>Description</u>	<u>Organisation</u>
1	Airseeker procurement	Planning, Allocation and Forecasting	Output forecasting tool	DE&S
2	Scavenger - Option 3 WLC	Planning, Allocation and Forecasting	Assessment and whole life cost models	DE&S
3	Watchkeeper (DMIS)	Procurement & Commercial	Risk analysis model providing Monte Carlo cost estimates to support investment decisions, latest Review Note and financial planning.	DE&S
4	Typhoon Support PSOP3	Planning, Allocation and Forecasting	Model to estimate forecast costs for the provision of EJ200 at outturn prices up to OSC 2030	DE&S
5	Typhoon Support PC5 IRS	Planning, Allocation and Forecasting	Model to estimate the Whole Life Cost of the PC5 IRS element of Typhoon Support Repairs and Services	DE&S
6	Typhoon Support PC5 CbC	Planning, Allocation and Forecasting	Model to estimate the Whole Life Cost of the PC5 CbC element of Typhoon Support Repairs and Services	DE&S
7	Typhoon Support RDSS	Planning, Allocation and Forecasting	Joint industry/MOD cost model to estimate the Whole Life Cost of the RDSS element of Typhoon Support Repairs and Services.	DE&S
8	Typhoon Support TAS2	Planning, Allocation and Forecasting	A model to estimate future forecast costs of Typhoon Support contract TAS2 to FY29/30.	DE&S
9	Typhoon Support C1	Planning, Allocation and Forecasting	Model to estimate the delivery of Typhoon Support Contract 1. Includes 3PE of uncertainty and cost	DE&S
10	UKMFTS - Rotary Wing Ascent Cost Model	Planning, Allocation and Forecasting	Model to estimate whole life costs of UKMFTS package	DE&S

⁴ <https://www.gov.uk/government/publications/study-into-mods-response-to-the-macpherson-review>

11	Lightning II - Through Life Cost Model	Planning, Allocation and Forecasting	Model used to produce through life costs	DE&S
12	Lightning II - Unit Recurring Flyaway (URF) Cost Model	Planning, Allocation and Forecasting	Unit Recurring Flyaway (URF) Cost Model (used for MG4 approval and now supporting ABC, QRPC)	DE&S
13	UKMFTS - Rear Crew Stage 2 Ascent Cost Model	Planning, Allocation and Forecasting	Rear Crew Stage 2 Financial and Risk Model	DE&S
14	Materiel Strategy Change Programme BC Model	Investment Appraisal	Cost model used for BC for MSP Business Case	DE&S
15	Materiel Strategy Change Programme Benefits Case Model	Investment Appraisal	Cost Model Used for Benefits Analysis included in the MSP Business Case.	DE&S
16	Historic Project Performance (Cost Growth and Schedule Slippage)	Planning, Allocation and Forecasting	Generates cost growth and schedule slippage indices from historic data and applies to current EPP cost profiles not covered by CAAS ICEs	DE&S
17	Apache CSP	Planning, Allocation and Forecasting	Cost Model	DE&S
18	Merlin IMOS PP3	Investment Appraisal	Cost Model	DE&S
19	Chinook TLCS PP3	Planning, Allocation and Forecasting	Cost Model	DE&S
20	Marshall	Investment Appraisal	Whole life cost model	DE&S
21	Multi Role Vehicle-Protected	Investment Appraisal	Cost model for future MRV-P	DE&S
22	Scout SV	Planning, Allocation and Forecasting	Cost, schedule and risk model for Scout Specialist Vehicle programme	DE&S
23	Challenger 2 Life Extension Programme	Planning, Allocation and Forecasting	Challenger LEP Pre-Initial Gate Cost Model	DE&S
24	Warrior Capability Sustainment Programme	Planning, Allocation and Forecasting	WCSP cost model for post Main Gate estimating activities. Used for QRPC, each quarter of the ABC cycle	DE&S
25	Armoured Battlefield Support Vehicle	Investment Appraisal	ABSV Cost Model	DE&S

26	PHOENIX 2	Investment Appraisal	Model has been used to inform the IA and the IGBC to allow the PHOENIX II project to move into the Assessment Phase (AP) of the project	DE&S
27	Future Fuelling Force 2020 (3F20)	Investment Appraisal	Cost model to baseline requirements cost	DE&S
28	LCS Transformation (LCS(T))	Investment Appraisal	Cost collation models for the purpose of Bidders / VFM team to complete for evaluation and as feeder models to the Investment Appraisal	DE&S
29	Maritime Surface Ships Enterprise Model	Planning, Allocation and Forecasting	Surface Ships Build and Support Enterprise	DE&S
30	QEC Acquisition	Procurement & Commercial	ACA Joint Cost Model - Cost model informed by COBRA, Risk Models, MoD in-year model, MoD EPP/ESP model, QEC Industry future support cost model	DE&S
31	T26 Joint Cost Model	Procurement & Commercial	Industry Joint Whole Life (EPP/ESP) Cost Model, Risk and opportunities Model, MoD in-year model, MoD EPP/ESP model	DE&S
32	Successor Platform Cost Model	Planning, Allocation and Forecasting	Model estimates whole life costs of the NGNPP programme	DE&S
33	Successor Infrastructure Cost Model	Planning, Allocation and Forecasting	Model estimates whole life costs of the proposed options for Submarine Dismantling Project	DE&S
34	Joint Cost Model / Submarine Enterprise Model	Planning, Allocation and Forecasting	Model produced to forecast for the totality of the Submarine Programme contracted with/planned to be contracted with BAES	DE&S
35	Submarine Programme Build Model BAES	Planning, Allocation and Forecasting	Model to estimate the Astute programme acquisition cost. Include 3 point estimates of cost uncertainty, cost risk and schedule risk	DE&S
36	DDL P Facilities	Procurement & Commercial	In-Service Superintendant Upkeep Submarines De-equip Defuel & Layup Preparations Facility	DE&S
37	Teutates	Planning, Allocation and Forecasting	The model was used to generate 10/50/90% confidence levels to support a MG Business Case submission to the IAC in January 2014	DE&S
38	D5 BRM U/G	Procurement & Commercial	Boost Rocket Motor (BRM)	DE&S

39	Successor : Next Generation Nuclear Propulsion Plant (NGNPP)	Planning, Allocation & Forecasting	Whole Life Cost estimation. Includes a 3 point estimate of uncertainty, cost and schedule risk. Key Outputs include application of:VAT & Inflation	DE&S
40	Core Production Capability (CPC)	Planning, Allocation & Forecasting	Model scope covers the factory regeneration and subsequent operating costs of the production facility for UK submarine fuel	DE&S
41	Nuclear Propulsion In Service Support Whole Life Cost Model (ESP)	Planning, Allocation & Forecasting	Nuclear Propulsion Whole Life Cost Model (ESP)	DE&S
42	Vulcan Post Operations Phase (VPOP)	Planning, Allocation & Forecasting	Estimates the Whole Life Cost of the proposed options for the continuation of STF Critical Operations and Vulcan Site maintenance and security	DE&S
43	TCC Spearfish Smooth Programme	Investment Appraisal	TCC Spearfish Smooth Programme	DE&S
44	FLAADS Land	Investment Appraisal	FLAADS Land/GBAD FI	DE&S
45	ASRAAM Blk 6	Investment Appraisal	ASRAAM Block 6 MG Cost Model	DE&S
46	Future Systems	Investment Appraisal	Future Systems Review Note Cost Model	DE&S
47	Storm Shadow Mid Life Relife	Investment Appraisal	Storm Shadow Support - MLR	DE&S
48	LTPA Financial Model (Qinetiq owned)	Procurement & Commercial	LTPA Repricing Model	DE&S
49	Combined Aerial Targets Service (CATs)	Procurement & Commercial	CATS Bid Model	DE&S
50	Capability Systems Model (CSM)	Planning	CSM is a system level model of the entire CBR protection system (including, detection, protection, sense, etc.) and provides understanding of the impact of capabilities within the CBR protective system.	Dstl
51	CDM	Planning	Model provides Front Line Analysts, Targeteers and Dstl Analysts with collateral damage and risk assessments of UK weapons pre-strike.	Dstl

52	Close Action Environment (CAEn)	Financial Evaluation	CAEn is a multi-sided close combat interactive wargame and simulation, representing the all arms close combat battle, at up to company group level. Up to 500 entities, which may represent individual soldiers, civilians, vehicles (including helicopters) or remote systems can be deployed in a CAEn scenario. Each entity may then act as a platform upon which sub-systems such as weapons, sensors, communication and other assets can be deployed.	Dstl
53	CUTLASS	Planning	A Dstl Man-In-The-Loop simulation facility primarily to assess the Operational Effectiveness of the F-35 Joint Strike Fighter, in a variety of Air-to-Air and Air-to-Ground Missions using Military Aircrew.	Dstl
54	Force Structure Cost Model (FSCM)	Forecasting	The model estimates the cost of the Defence Programme out to 30 years. Key outputs include: Cost of Force elements (Equivalent Annual Cost, Whole Life Cost, etc) to inform Balance of investment studies; Manpower; and Equipment. The model is not a detailed programming / budgeting tool, although it can be used to provide a high-level check of whether a proposed Force Structure is affordable.	Dstl
55	Hazard Prediction and Assessment Capability (HPAC)	Science-based	US hazard prediction model used to provide advice on hazard areas in the event of a Chemical or Biological release. Advice is provided to the MOD and civil authorities to support decision making.	Dstl
56	Integrated Survivability Toolset (IST)	Financial Evaluation	This toolset is used to calculate the survivability of land platforms (in user defined configurations) within user defined scenarios. The toolset considers the impact of the Vulnerability, Lethality, Mobility and Sensing capabilities of UK and threat systems in order to determine the overall survivability of UK platforms within the threat environment. This data can then be used to trade off different capabilities to determine the impact of procurement choices or to inform capability audits.	Dstl
57	PALETTE	Planning	Weapon lethality model for land based Hard targets.	Dstl
58	SADM	Planning	Model used to support Naval Operational Planning	Dstl

59	SAM, GAPS and DEBRIEF	Planning	A suite of software tools for the replay and analysis of a variety of data types recorded during submarine operations. The results of these analyses are fed directly into the planning and execution of current and future operations.	Dstl
60	Strategic Balance of Investment Toolset (StratBol)	Financial Evaluation	A balance of investment toolset, investigating the cost effective balance of Force Elements and enablers required to undertake the full range of required military operations, as defined in MoD strategic guidance. (A Force Element is a MoD term to describe an appropriate collection of Trained Equipped Personnel, such as a Battalion, Ship Platform or Air Force Element (Aircraft or Squadron).) Can explore 'what if' scenarios in relation to areas such as cost, policy or capability.	Dstl
61	TARVIEW	Planning	Weapon lethality model for land based mobile and relocatable targets.	Dstl
62	Unified Weapons Modelling - Weapon Target Interaction (UWM-WTI)	Financial Evaluation	This collection of models is used to assess the vulnerability of UK platforms (including personnel) to threat weapons and the lethality of UK weapons on threat targets. Weapons modelled include long rod penetrators, burst fire cannon rounds, small arms, fragmentation weapons and shaped charge warheads. Targets modelled include armoured fighting vehicles, protected mobility vehicles, land fires vehicles, engineering vehicles, logistic vehicles and dismounted personnel.	Dstl
63	WISE	Financial Evaluation	WISE is a formation(Div/Bde) or unit (BG) level all-arms combat model, concentrating on land forces but with some ability to represent the impact of Air and Naval forces on the ground battlespace.	Dstl
64	Army Basing Programme Model (ABP)	Forecasting	Evaluation of impacts of rebasing options.	DIO
65	Living Accommodation Strategy Review (LASR)	Forecasting supply and demand of accommodation and cost	Data on supply and demand of military accommodation, by type and condition in order to evaluate how much accommodation we have and what the cost will be to meet demand at the right condition level based on cost inputs.	DIO

66	Strategic Planning Tool Repository	Financial Evaluation & Forecasting	Model holding all data pertaining to cost of operation, disposal value, housing potential, usage, current & future occupiers in the UK (excluding Defence Training Estate)	DIO
67	Army Basing Programme Project Allenby Connaught Footprint Financial Model	Economic and financial case to support approvals decisions.	Model to support IGBC down selection point to a preferred option. Evaluates the economic case (NPV) and financial case (affordability) of a number of options.	DIO
68	Army Basing Programme Salisbury Plain Training Areas SFA Financial Model	Economic and financial case to support approvals decisions.	Model to support IGBC down selection point to a preferred option. Evaluates the economic case (NPV) and financial case (affordability) of a number of options.	DIO
69	Future Overseas Procurement (FOP)	Economic and financial case to support approvals decisions.	Model to support IGBC down selection point to a preferred option. Evaluates the economic case (NPV) and financial case (affordability) of a number of options.	DIO
70	Hestia (South East) Financial Model	Economic and financial case to support approvals decisions.	Model to support IGBC down selection point to a preferred option. Evaluates the economic case (NPV) and financial case (affordability) of a number of options.	DIO
71	Hestia (South) Financial Model	Economic and financial case to support approvals decisions.	Model to support IGBC down selection point to a preferred option. Evaluates the economic case (NPV) and financial case (affordability) of a number of options.	DIO
72	United States Visiting Forces (USVF) Next Generation Estate Contract	Economic and financial case to support approvals decisions.	Model to support MGBC tenderer selection decision point. Evaluates the economic case (NPV) and financial case (affordability) of a number of tenderers and potential first generation outsourcing decisions.	DIO
73	Allenby Connaught PFI Financial Model	Contract model forecasting costs and estimating contractual changes.	PFI Financial Model jointly owned with Service Provider, used to set original contract price and price changes due to in-service amendments. One ESCROW model plus variants for scenario modelling. Currently used to inform decisions on PFI savings initiatives.	DIO

74	Aquatrine Package A PFI Financial Model	Contract model forecasting costs and estimating contractual changes.	PFI Financial Model jointly owned with Service Provider, used to set original contract price and price changes due to in-service amendments. One ESCROW model plus variants for scenario modelling. Currently used to inform decisions on PFI savings initiatives.	DIO
75	Aquatrine Package B PFI Financial Model	Contract model forecasting costs and estimating contractual changes.	PFI Financial Model jointly owned with Service Provider, used to set original contract price and price changes due to in-service amendments. One ESCROW model plus variants for scenario modelling. Currently used to inform decisions on PFI savings initiatives.	DIO
76	Aquatrine Package C PFI Financial Model	Contract model forecasting costs and estimating contractual changes.	PFI Financial Model jointly owned with Service Provider, used to set original contract price and price changes due to in-service amendments. One ESCROW model plus variants for scenario modelling. Currently used to inform decisions on PFI savings initiatives.	DIO
77	ARMADA PFI Financial Model	Contract model forecasting costs and estimating contractual changes.	PFI Financial Model jointly owned with Service Provider, used to set original contract price and price changes due to in-service amendments. One ESCROW model plus variants for scenario modelling. Currently used to inform decisions on PFI savings initiatives.	DIO
78	Colchester PFI Financial Model	Contract model forecasting costs and estimating contractual changes.	PFI Financial Model jointly owned with Service Provider, used to set original contract price and price changes due to in-service amendments. One ESCROW model plus variants for scenario modelling. Currently used to inform decisions on PFI savings initiatives.	DIO
79	Corsham PFI Financial Model	Contract model forecasting costs and estimating contractual changes.	PFI Financial Model jointly owned with Service Provider, used to set original contract price and price changes due to in-service amendments. One ESCROW model plus variants for scenario modelling. Currently used to inform decisions on PFI savings initiatives.	DIO

80	Main Building PFI Financial Model	Contract model forecasting costs and estimating contractual changes.	PFI Financial Model jointly owned with Service Provider, used to set original contract price and price changes due to in-service amendments. One ESCROW model plus variants for scenario modelling. Currently used to inform decisions on PFI savings initiatives.	DIO
81	Northwood PFI Financial Model	Contract model forecasting costs and estimating contractual changes.	PFI Financial Model jointly owned with Service Provider, used to set original contract price and price changes due to in-service amendments. One ESCROW model plus variants for scenario modelling. Currently used to inform decisions on PFI savings initiatives.	DIO
82	Cost and demand forecasting	Forecasting	Basic forecasting model takes the consumption data recorded in IMS as the basis for future consumption. This is adjusted to an average year for weather, and factors in the utility impact of projects where these are also recorded in IMS. The current version uses an average price per fuel per market area (Country) to derive an indicative cost/forecast spend on Utilities	DIO
83	Fuel Subsidy Scheme (Cyprus)	Personnel Allowances & Payments	Establishes the balance between energy bills paid by the MOD for around 1000 SFA across Cyprus, against energy used by these properties and monies taken from pay through F&L payments to determine if each SFA Occupant on the scheme owes money, is owed money, or that their account is in balance.	DIO
84	Fuel Subsidy Scheme (Germany)	Personnel Allowances & Payments	Establishes the balance between energy bills paid by the MOD for around 6000 (reducing with drawdown) SFA across Germany, against energy used by these properties and monies taken from pay through F&L payments to determine if each SFA Occupant on the scheme owes money, is owed money, or that their account is in balance.	DIO

85	Fuel Subsidy Scheme (UK)	Personnel Allowances & Payments	Establishes the balance between energy bills paid by the MOD for around 600 selected SFA, against energy used by these properties and monies taken from pay through F&L payments to determine if each SFA Occupant on the scheme owes money, is owed money, or that their account is in balance.	DIO
86	Greening Government Tracker	Central Government Reporting	Excel Data Tracker populated with MOD Energy Consumption across 398 principle sites. Carried out Calculations to convert kWh into Tonnes of CO2. Contains historic MOD Energy data sets back until 2009.	DIO
87	TRIAD assessment	Modelling	The model developed assesses the reduction in energy demand achieved by individual sites during TRIAD warning periods against a day before/day after comparator. This is used as the basis to determine the levels of TRIAD savings achieved by each site.	DIO
88	Algorithm	Forecasting tool	Forecasts staffing requirements	DIO
89	EOM D5 - IPE	QS Summary of cost	Standard form of cost presentation	DIO
90	Capital Infrastructure Programme (CIP) Report and Scenario Modelling Tool	Infrastructure Investment Portfolio Business Intelligence	The CIP is the top level infrastructure CDEL investment programming and senior decision support tool, used by both DIO and MOD. The CIP is both a BI View of all CDEL Delivery and Investment by MOD, primarily Capital Projects and SD Work Tasks delivered by IPs. It also has basic functionality to develop programme/portfolio 'scenarios' and uses the existing BI within the spreadsheet to compare the 'scenario' with the 'current baseline' position. The CIP is increasingly relying upon data from IMS, in the form of an interim PDG Report from IMS. There are still other legacy sources of data that 'feed' the CIP; primarily the CDEL projects and work tasks being delivered by SD.	DIO
91	CRC Summary	Forecasting	Converts the reportable consumption data from kWh to Tonnes CO2 and calculates the total final cost of ensuring compliance for reporting year.	DIO

92	EU ETS Allowance Balance	Forecasting	Created to provide a clear view of the MODs EU allowance holdings and determine any deficit/surplus based on estimated annual emissions.	DIO
93	Life-Cycle Cost Resource Analysis (LiCRA)	Forecasting	Forecasting of future estate maintenance requirements and associated financial costs.	DIO
94	Workforce Planning Model	Forecasting	Model to forecast workforce requirements and possible gaps relative to forecast workforce.	DIO
95	Manpower Models (Navy/Army/Air/Civilian)	Planning	Modelling use of manning levers to achieve future personnel commitments	Head Office
96	New Employment Modelling	Forecasting	Forecasts of MOD military pay bill under New Employment Model	Head Office
97	Economic impact of FCAS	Policy simulation	An assumption based model that ranks FCAS options by the effect each option has on the UK economy.	Head Office