

The Polaris Sales Agreement

Polaris Sales Agreement Between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the United States of America

The Government of the United States of America and the Government of the United Kingdom of Great Britain and Northern Ireland, recalling and affirming the "Statement on Nuclear Defence Systems"⁽¹⁾ included in the joint communique issued on December 21, 1962, by the President of the United States of America and the Prime Minister of Her Majesty's Government in the United Kingdom of Great Britain and Northern Ireland, have agreed as follows:—

Article I

1. The Government of the United States shall provide and the Government of the United Kingdom shall purchase from the Government of the United States Polaris missiles (less warheads), equipment, and supporting services in accordance with the terms and conditions of this Agreement.

2. This Agreement shall be subject to the understandings concerning British submarines equipped with Polaris missiles (referred to in paragraphs 8 and 9 of the Nassau "Statement on Nuclear Defence Systems" agreed by the President of the United States and the Prime Minister at their meeting held in the Bahamas between December 18 and 21, 1962.

Article II

1. In recognition of the complexity of the effort provided for in this Agreement and the need for close coordination between the contracting Governments in giving effect to its terms, the two Governments shall promptly establish the organisational machinery provided for in the following paragraphs of this Article.

(1) Cmnd. 1915.

2. The Department of Defense, acting through the Department of the Navy, and the Admiralty or such other agency as the Government of the United Kingdom shall designate will be the Executive Agencies of their respective Governments in carrying out the terms of this Agreement. Appropriate representatives of the Executive Agencies are authorized to enter into such technical arrangements, consistent with this Agreement, as may be necessary.

3. A Project Officer will be designated by each Government's Executive Agency with direct responsibility and authority for the management of the activities of that Government under this Agreement. Each Project Officer will designate liaison representatives, in such numbers as may be agreed, who will be authorized to act on his behalf in capacities specified in technical arrangements and who will be attached to the Office of the other Project Officer.

4. A Joint Steering Task Group will be established by the Project Officers to advise them, *inter alia*, concerning the development of new or modified equipment to meet specific requirements of the Government of the United Kingdom, and concerning interfaces between the equipment provided by the two Governments respectively. The Joint Steering Task Group will comprise the Project Officers (or their representatives), and principal liaison representatives, and may include selected leaders from among the scientists, industrialists and government executives of the United Kingdom and of the United States. The Joint Steering Task Group will meet approximately every three months alternatively in the United Kingdom and in the United States under the chairmanship of the resident Project Officer.

Article III

1. The Government of the United States (acting through its Executive Agency) shall provide, pursuant to Article I of this Agreement, Polaris missiles (less warheads), equipment, and supporting services of such types and marks and in such quantities as the Government of the United Kingdom may from time to time require, and in configurations and in accordance with delivery programmes or time tables to be agreed between the Project Officers. In the first instance the missiles, equipment, and supporting services provided by the Government of the United States shall be sufficient to meet the requirements of a programme drawn up by the Government of the United Kingdom and communicated to the Government of the United States prior to the entry into force of this Agreement.

2. The missiles, equipment, and supporting services referred to in paragraph 1 of this article are the following:

- a. Polaris missiles (less warheads but including guidance capsules);
- b. missile launching and handling systems;
- c. missile fire control systems;
- d. ships navigation systems;

e. additional associated, support, test, and training equipment and services including, but not limited to:

- (i) test and check-out equipment, specialized power supplies, power distribution systems and support equipment associated with the items enumerated in subparagraphs a, b, c, and d. of this paragraph and adequate in type and quantity to meet the requirements of installations both aboard ship and ashore;
- (ii) specialized equipment including the types specified in subparagraphs a, b, c, d, and e.(i) of this paragraph for use in such support and training facilities as may be provided by the Government of the United Kingdom;
- (iii) construction spares and spare parts adequate in scope and quantity to ensure the continued maintenance of the equipment specified in subparagraphs a, b, c, d, e.(i), and e.(ii) of this paragraph;
- (iv) (a) latest available United States technical documentation including specifications, blueprints, and manuals covering the missiles and equipment listed in subparagraphs a, b, c, d, e.(i), e.(ii) and e.(iii) of this paragraph in sufficient scope and quantity to cover safety requirements and permit successful transport, installation, operation, and maintenance by the Government of the United Kingdom of all equipment purchased under the terms of this Agreement;
(b) latest available United States technical documentation, as may be necessary from time to time in individual cases, to permit manufacture by the Government of the United Kingdom to the extent necessary for the maintenance, repair, and modification of the items listed in subparagraphs a, b, c, d, e.(i), e.(ii) and e.(iii) of this paragraph;
- (v) services including:
 - (a) use, as appropriate, of existing support and missile range facilities in the United States;
 - (b) assistance in programme management techniques and, in addition, those engineering and lead shipyard services required to ensure proper system integration, installation, and checkout in the United Kingdom; to the extent required and available appropriate modification, maintenance, and overhaul of the equipment listed in subparagraphs a, b, c, d, e.(i), e.(ii), e.(iii) of this paragraph;
 - (c) research, design, development, production, test, or other engineering services as may be required to meet specific United Kingdom requirements;
 - (d) training of naval and civil personnel in the service of the Government of the United Kingdom and United Kingdom contractors to the extent to which they are involved in the inspection, installation, operation, maintenance, repair, and modification of the equipment listed in subparagraphs, a, b, c, d, e.(i), e.(ii), e.(iii) of this paragraph.

Article IV

Future developments relating to the Polaris Weapon System, including all modifications made thereto, by the Government of the United States or the Government of the United Kingdom shall, in the areas enumerated in Article III, be made reciprocally available through their Executive Agencies in accordance with the terms of this Agreement, reciprocally applied.

Article V

The Government of the United Kingdom will provide the submarines in which will be installed the missiles and equipment to be provided under this Agreement, and will provide the warheads for these missiles. Close coordination between the Executive Agencies of the contracting Governments will be maintained in order to assure compatibility of equipment. Information concerning the hull, auxiliary machinery, and equipment of United States submarines transmitted under the authority of this Agreement will be such as is necessary to obtain a satisfactory interface between the equipment provided by the two Governments respectively. This Agreement does not, however, authorize the sale of, or transmittal of information concerning, the nuclear propulsion plants of United States submarines.

Article VI

1. In carrying out this Agreement, the Government of the United States will use, to the extent practicable, established Department of Defense contracting procedures and existing Polaris contracts. In any event contracts for production or work for the Government of the United Kingdom will be incorporated in or placed on the same terms as those for the Government of the United States. When appropriate the United States Project Officer will direct that amendments be sought to existing contracts and that terms be incorporated in new contracts to safeguard any special requirements of the Government of the United Kingdom in the contract subject matter which may arise in connection with this Agreement, for example, to provide for any alterations or any reduction of quantities which may be necessary.
2. The missiles and equipment provided by the Government of the United States under this Agreement shall be fabricated to the same documentation and quality standards as are the counterparts for the United States Polaris Program.
3. The missiles and equipment provided by the Government of the United States under this Agreement will be integrated with the scheduled United States Polaris Program and will be fabricated on a schedule which will make the most efficient and economical use of existing United States production lines. Deliveries will be made upon a schedule to be defined by

the Government of the United Kingdom, but which is consonant with the above fabrication schedule.

Article VII

1. The Government of the United States shall ensure that all supplies (which term throughout this Article includes, but without limitation, raw materials, components, intermediate assemblies and end items) which it will provide under this agreement are inspected to the same extent and in the same manner (including the granting of waivers and deviations) as are the counterparts for the United States Polaris Program. The United Kingdom Project Officer or his designated representative may observe the inspection process and offer his advice to the United States Government Inspector regarding the inspection, without delay to, or impairment of the finality of, the inspection by the Government of the United States.
2. The United States Project Officer through appropriate procedures will notify the United Kingdom Project Officer when final inspection of each end item will take place, and will furnish a certificate or certificates upon completion of each such inspection stating that this inspection has been made and that such end item has been accepted as having met all requirements of the relevant acceptance documentation (subject to any appropriate waivers and deviations). Copies of acceptance documentation and quality standards, together with reports required thereby, will be furnished to the United Kingdom Project Officer or his designated representative.
3. The Government of the United Kingdom will take delivery of the supplies as agreed pursuant to Article X following inspection, acceptance and certification by the Government of the United States. Delivery to the Government of the United Kingdom shall not relieve the Government of the United States from continuing responsibility for using its best endeavours thereafter to secure the correction or replacement of any items found not to have been manufactured in strict accordance with the documentation and quality standards referred to in Article VI or to be otherwise defective. Such corrections or replacements will be at the expense of the Government of the United Kingdom to the extent they are not covered by warranty or guarantee or otherwise recoverable by the Government of the United States.
4. The Government of the United States will use its best endeavours to obtain for or extend to the Government of the United Kingdom the benefit of any guarantees or warranties negotiated with United States contractors or subcontractors.

Article VIII

The Government of the United Kingdom shall indemnify and hold harmless the Government of the United States against any liability or loss

resulting from unusually hazardous risks attributable to Polaris missiles or equipment identifiable, respectively, as missiles or equipment supplied or to be supplied to the Government of the United Kingdom under this Agreement. Unusually hazardous risks, for the purposes of this Agreement, are those defined by applicable statutes of the United States, or by any appropriate administrative act under the authority of such statutes, or held to exist by a court of competent jurisdiction. The Government of the United States shall give the Government of the United Kingdom immediate notice of any suit or action filed or of any claim made to which the provisions of this Article may be relevant. Representatives of the United Kingdom may be associated with the defence, before a court of competent jurisdiction, of any claim which may be borne in whole or in part by the Government of the United Kingdom. In procurement contracts for supplies and services made pursuant to this Agreement the Government of the United States is authorized to include unusually hazardous risk indemnification provisions substantially similar to those included in its own corresponding contracts.

Article IX

1. The Government of the United States will follow its normal procurement practices in securing all rights it considers to be essential to enable it to provide the missiles and equipment to be supplied to the Government of the United Kingdom under this Agreement. In addition, the Government of the United States shall notify the Government of the United Kingdom of any claim asserted hereafter for compensation for unlicensed use of patent rights alleged to be involved in the supply of such missiles and equipment to the Government of the United Kingdom, and the two Governments will consult as to the appropriate disposition of such claim.
2. The Government of the United Kingdom shall reimburse the Government of the United States for any payments made by the Government of the United States in settlement of liability, including cost and expenses, for unlicensed use of any patent rights in the manufacture or sale of the missiles and equipment supplied or to be supplied to the Government of the United Kingdom under this Agreement.

Article X

1. Delivery of equipment other than missiles to be provided under this Agreement for installation in submarines or supporting facilities to be provided by the Government of the United Kingdom shall be the responsibility of the Government of the United States and shall be made to those locations within the United Kingdom where the equipment is re-

quired. In addition to delivery of such equipment, the Government of the United States shall, subject to reimbursement for costs incurred, be responsible for providing such technical installation and testing services as are required by the Government of the United Kingdom for the satisfactory installation, check-out and testing of that equipment in submarines and supporting facilities of the United Kingdom.

2. Delivery of all missiles shall be made to appropriate carriers of the United Kingdom, or, if it is agreed, of the United States, at such United States supply points as are agreed by the Executive Agencies of both Governments. The Government of the United States shall be responsible for the initial check-out of all missiles provided under this Agreement.

Article XI

1. The charges to the Government of the United Kingdom for missiles, equipment, and services provided by the Government of the United States will be:

- a. The normal cost of missiles and equipment provided under the joint United States-United Kingdom production programme integrated in accordance with Article VI. This will be based on common contract prices together with charges for work done in United States Government establishments and appropriate allowance for use of capital facilities and for overhead costs.
- b. An addition of 5% to the common contract prices under subparagraph 1.a. of this Article for missiles and equipment provided to the United Kingdom, as a participation in the expenditures incurred by the Government of the United States after January 1, 1963, for research and development.
- c. Replacement cost of items provided from United States Government stock or, with respect to items not currently being procured, the most recent procurement cost.
- d. The actual cost of any research, design, development, production, test or other engineering effort, or other services required in the execution of this Agreement to meet specific United Kingdom requirements.
- e. The cost of packing, crating, handling and transportation.
- f. The actual costs of any other services, not specified above, which the Project Officers agree are properly attributable to this Agreement.

2. Payments by the Government of the United Kingdom in accordance with paragraph 1. of this Article shall be made in United States dollars. Payments to United States agencies and contractors shall be made, as they become due, from a trust fund which will be administered by the United States Project Officer. All payments out of the Trust Fund shall be certified to be in accordance with the terms of the Agreement. The Trust Fund will consist initially of a sum to be paid as soon as possible after entry into force of this Agreement and to be equivalent to the payments

estimated to fall due during the first calendar quarter of programme operations. Before the end of that quarter and of each succeeding quarter deposits shall be made by the Government of the United Kingdom with the object of having sufficient money in the Fund to meet all the calls which will be made upon it in the succeeding three months.

3. If at any time, the unexpended balance in the Trust Fund established pursuant to paragraph 2. of this Article falls short of the sums that will be needed in a particular quarter by the Government of the United States to cover:

- a. payment for the value of items to be furnished from the stocks of, or services to be rendered by, the Government of the United States;
- b. payment by the Government of the United States to its suppliers for items and services to be procured for the Government of the United Kingdom; and
- c. estimated liability or costs that may fall to be met by the Government of the United States as a result of termination of such procurement contracts at the behest of the Government of the United Kingdom;

the Government of the United Kingdom will pay at such time to the Government of the United States such additional sums as will be due. Should the total payments received from the Government of the United Kingdom prove to be in excess of the final total costs to the Government of the United States, appropriate refund will be made to the Government of the United Kingdom at the earliest opportunity with final adjustment being made within thirty days after determination of said final costs.

4. The United States Project Officer will maintain a record of expenditures under this Agreement in accordance with established Navy Special Projects Office Accounting procedures which record will be available for audit annually by representatives of the Government of the United Kingdom.

Article XII

1. The provisions of this Article concerning proprietary rights shall apply to the work referred to in subparagraph 1.d. of Article XI of this Agreement (hereinafter called in this Article "the work").

2. The Government of the United States shall ensure that the Government of the United Kingdom will receive a royalty-free, non-exclusive, irrevocable license for its governmental purposes:

- a. to practice or cause to be practiced throughout the world, all inventions conceived or first actually reduced to practice in the performance of the work; and
- b. to use or cause to be used throughout the world, all technical information first produced in the performance of the work.

3. In addition, the Government of the United States shall take the following steps to ensure the right of the Government of the United Kingdom to

reproduce, by manufacturers of its own choice, items developed in the performance of the work. In respect of those elements of this right not included in subparagraphs 2.a. and 2.b. of this Article, the Government of the United States shall:

- a. to the extent that it owns or controls such elements, accord free user rights to the Government of the United Kingdom;
 - b. obtain the agreement of contractors and subcontractors performing the work to make available to the Government of the United Kingdom, on fair and reasonable terms and conditions, those elements which the contractor or sub-contractor owns or controls at the commencement of the work or acquires during the performance of the work;
 - c. use its best endeavours to obtain for the Government of the United Kingdom or to assist the Government of the United Kingdom to obtain directly or through its own manufacturers, on fair and reasonable terms and conditions, elements of this right not covered by subparagraphs 2.a. and 2.b. of this Article.
4. The Government of the United States shall also ensure that the Government of the United Kingdom will receive the same rights as those referred to in paragraphs 2. and 3. of this Article in respect of any material now or hereafter covered by copyright produced or delivered in the performance of the work.
5. The Government of the United States shall furnish to the Government of the United Kingdom, in such quantities as may be agreed:
- a. all documentation obtained by the Government of the United States under contracts placed for the performance of the work;
 - b. all documentation, owned or controlled by the Government of the United States, necessary for reproduction, by or on behalf of the Government of the United Kingdom, of items developed during the performance of the work.
6. It is understood that the Government of the United States will obtain for itself such of the rights referred to in subparagraphs 2.a., 2.b., and 3. of this Article as it may require for its governmental purposes.
7. The term "owned or controlled" as used in this Article means the right to grant a licence without incurring liability to any private owner of a proprietary or other legal interest.
8. The Government of the United States will use its best endeavours to ensure that there will be made available by United States manufacturers to the Government of the United Kingdom, on fair and reasonable terms and conditions, such technical assistance – for example, loan of engineers, or training – as the Government of the United Kingdom desires in order to permit the production by manufacturers of its own choice of the items developed in the performance of the work.
9. The Government of the United States will insert suitable provisions in all prime contracts for the work to ensure the availability to the Government of the United Kingdom of the rights, set forth in this Article, including a requirement that similar provisions be placed in subcontracts.

Article XIII

1. The Government of the United States, to the extent that it can do so without incurring liability to any private owner of a proprietary or other legal interest shall grant to the Government of the United Kingdom: (i) the right to reproduce and use, royalty-free, the technical documentation referred to in subparagraph 2.e.(iv) of Article III for the purposes stated in that subparagraph; and (ii) a non-exclusive, royalty-free licence to practice or cause to be practiced any invention for these purposes.
2. In respect of any part of the technical documentation referred in paragraph 1 of this Article which the Government of the United States cannot furnish to the Government of the United Kingdom without incurring a liability to a private owner of a proprietary or other legal interest, the Government of the United States will use its best endeavours to assist the Government of the United Kingdom in securing for the Government of the United Kingdom on fair and reasonable terms and conditions the right to use such documentation for the purposes stated in subparagraph 2.e.(iv) of Article III.

Article XIV

1. The Government of the United Kingdom shall not, without the prior express consent of the Government of the United States, transfer, or permit access to, or use of, the missiles, equipment, services, or documents or information relating thereto which are provided by the Government of the United States under this Agreement, except to a United Kingdom officer, employee, national or firm engaged in the implementation of this Agreement.
2. The Government of the United Kingdom shall undertake such security measures as are necessary to afford classified articles, services, documents or information substantially the same degree of protection afforded by the Government of the United States in order to prevent unauthorized disclosure or compromise.

Article XV

Annually, on or before the first of July, the Project Officers will prepare a formal joint report to the contracting Governments of action taken and progress made under this Agreement and a forecast of schedules and costs for completion. In addition, other more frequent joint reports will be submitted, as agreed upon by the Project Officers, to the heads of the Executive Agencies.

Article XVI

This Agreement shall enter into force on the date of signature.
 IN WITNESS WHEREOF the undersigned, being duly authorized thereto by their respective Governments, have signed this Agreement.
 DONE in duplicate at Washington this sixth day of April, 1963.

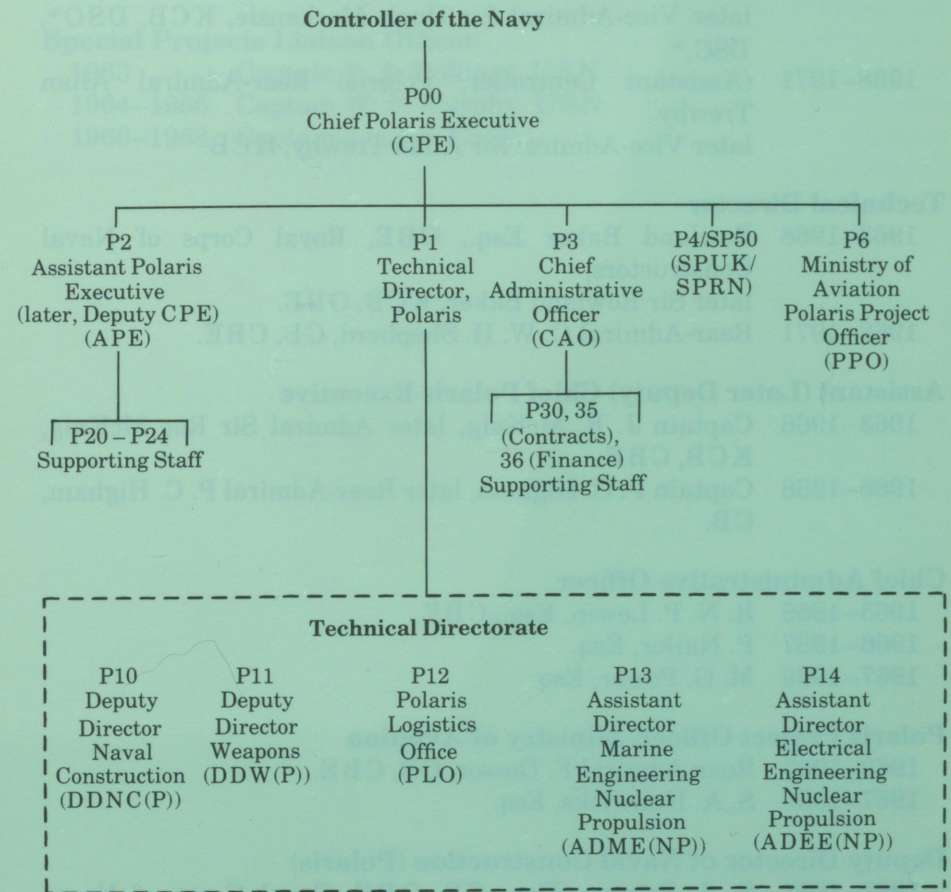
For the Government of the United States of America:
 (Sd.) DEAN RUSK

For the Government of the United Kingdom of Great Britain and Northern Ireland:
 (Sd.) D. ORMSBY GORE

APPENDIX II

The Polaris Executive Organisation

Outline of the Polaris Executive Organisation 1963-67



The Management Staff

Polaris Executive Senior Management in the Construction and Deployment Period

Chief Polaris Executive

- 1963–1968 Rear-Admiral H. S. Mackenzie, DSO*, DSC*,
later Vice-Admiral Sir Hugh Mackenzie, KCB, DSO*,
DSC.*
- 1968–1971 (Assistant Controller, Polaris) Rear-Admiral Allan
Trewby,
later Vice-Admiral Sir Allan Trewby, KCB.

Technical Director

- 1963–1968 Rowland Baker Esq., OBE, Royal Corps of Naval
Constructors,
later Sir Rowland Baker, KCB, OBE.
- 1968–1971 Rear-Admiral C. W. H. Shepherd, CB, CBE.

Assistant (Later Deputy) Chief Polaris Executive

- 1963–1966 Captain J. R. McKaig, later Admiral Sir Rae McKaig,
KCB, CBE.
- 1966–1968 Captain P. C. Higham, later Rear-Admiral P. C. Higham,
CB.

Chief Administrative Officer

- 1963–1966 R. N. P. Lewin, Esq., CBE.
- 1966–1967 P. Nailor, Esq.
- 1967–1969 M. G. Power, Esq.

Polaris Project Officer, Ministry of Aviation

- 1963–1967 Rear-Admiral F. Dossor, CB, CBE.
- 1967–1969 S. A. Hunwicks, Esq.

Deputy Director of Naval Construction (Polaris)

- 1963–1967 S. J. Palmer, Esq., CB, OBE, Royal Corps of Naval
Constructors.
- 1967–1969 H. J. Tabb, Esq., Royal Corps of Naval Constructors.

Deputy Director, Weapons (Polaris)

- 1963–1968 Captain C. W. H. Shepherd, later Rear-Admiral C. W. H.
Shepherd, CB, CBE.

Polaris Logistics Officer

- 1963–1969 Captain L. Bomford

Assistant Director Marine Engineering (Nuclear Propulsion)

- 1963–1969 Captain L. D. Dymoke, later Rear-Admiral L. D. Dymoke,
CB.

Assistant Director Electrical Engineering (Nuclear Propulsion)

- 1963–1968 H. C. Fitzer, Esq., CB, OBE.

Royal Navy Liaison Officer (Special Projects)

- 1963–1966 Captain P. G. La Niece, later Rear-Admiral P. G. La
Niece, CB, CBE.
- 1966–1968 Captain C. H. Hammer, OBE.

Special Projects Liaison Officer

- 1963 Captain P. A. Rollings, USN.
- 1964–1966 Captain W. P. Murphy, USN.
- 1966–1968 Captain J. Love, USN.

APPENDIX IV

Programme Management Plans

Programme Management Plans were extensively used in the United Kingdom programme and in the Joint US-UK POLARIS programme, as a systematic method of identifying programme objectives and responsibilities. They consisted essentially of bar-charts, which described, in different levels of detail, the components and milestone activities in an area of work or task. The necessity of covering large areas of work concisely called for 'families' of PMPs; at the summary, or 'parent' level, a major component (e.g. 'machinery installation') might itself be embodied in a complete PMP breakdown at the secondary level. The following pages illustrate PMP construction, including the allocation of responsibilities for the achievement of the work described.

Programme Management Plan (PMP) Construction - Family 1

Task / Milestone	Start	End	Level	Responsible Party
Overall Programme Management	1959	1963	Level 1	Programme Management Office
Design and Development	1959	1962	Level 2	Design Office
Construction	1960	1963	Level 2	Construction Office
Commissioning	1962	1963	Level 2	Commissioning Office
Machinery Installation	1960	1961	Level 3	Installation Team
Electrical Installation	1960	1961	Level 3	Electrical Team
Systems and Components Installation	1960	1961	Level 3	Systems Team
Structural Installation	1960	1961	Level 3	Structural Team
Polaris System Installation	1961	1962	Level 3	Polaris System Team
Weapons and Torpedo Mounting Installation	1961	1962	Level 3	Weapons and Torpedo Team
Final Acceptance Testing	1962	1963	Level 3	Testing Team

Chart 1

APPENDIX IV

Specimen Programme Management Plan (SSBN04: Construction, Testing and Commissioning)
PROGRAMME MANAGEMENT PLAN - LONG TERM

Chart P10/4

December, 1967

Classification RESTRICTED

Plan for

 SSBN 04

 Construction, Testing
 and Commissioning.

Responsibilities

Direct	Suptng	Montng	Contr
P15	DPT 10	CL	CL
P15	DPT 10	CL	CL
P15	DPT 10	CL	CL
P15	DPT 10	CL	CL
P15	DPT 10	CL	CL
P15	DPT 10	CL	CL
P13	DPT 6	CL	CL
P13	DPT 3	CL	CL
P16	DPT 16	CL	CL
P15	DPT 10	CL	CL
P15	DPT 10	CL	CL
P13	DPT 18	CL	CL
P15	DPT 10	CL	CL
P15	DPT 10	CL	CL
P10	DPT 10	CL	CL
P16	DPT 16	CL	CL
P11	P111	CL	CL
P15	DPT 10	CL	CL
P15	DPT 10	CL	CL
P13	DPT 18	CL	CL
P15	DPT 10	CL	CL
P13	DPT 3	CL	CL
P13	DPT 6	CL	CL
P13	DPT 3	CL	CL
P10	DPT 10	Various	CL

MAJOR COMPONENTS		1964	1965	1966	1967	1968	1969
		JFM, AMJ, JAS, OND	JFM, AMJ, JAS, OND	JFM, AMJ, JAS, OND	JFM, AMJ, JAS, OND	JFM, AMJ, JAS, OND	JFM, AMJ, JAS, OND
	HULL CONSTRUCTION						
	HULL SERVICES AND OUTFIT						
	MACHINERY INSTALLATION						
	ELECTRICAL INSTALLATION						
	SONAR AND TORPEDO EQUIPMENT INSTALLATIONS						
	POLARIS SYSTEM INSTALLATION						
	TESTING						
Action Milestones		1964	1965	1966	1967	1968	1969
					For'cst	R'sch'd	Ach'ved
1	▽ ○ Third Missile Unit to Berth	Nov 66					2/67
2	▽ ○ Accomdn Unit No. 1 (Hull Unit 10) to Berth Position	Dec 66					2/67
3	▽ ○ Accomdn Unit No. 2 (Hull Unit 11) to Berth Position	Dec 66					2/67
4	☆ Complete Sonar Array on Jig	Jan 67					11/66
5	▽ ○ Torpedo Compartment to Berth	Mar 67					30/5/67
6	▽ ○ Fore End Construction to Berth	Mar 67					16/6/67
7	▽ ○ Complete Shaft Bore	May 67					7/67
8	○ Ship Reactor Pressure Vessel	Sep 67					28/9/67
9	○ Complete Installation of Main Switchboard	Sep 67					
10	Complete Shielding ECT Closer	Dec 67					
11	○ Complete Final Checking of Sonar 2001 Array	Dec 67					
12	Complete Welding Primary Circuit	Feb 68					
13	Final Sight Torpedo Equipment	Feb 68					
14	Start Instal Launch Tubes	Mar 68					
15	Launch	Mar 68					
16	Complete Pulling Main Cables	May 68					
17	Complete Phase 2 Fire Control Testing	Jun 68					
18	Complete MCC Air Balance	Jul 68					
19	Missile Hydraulics Complete	Jul 68					
20	Initial Fill	Aug 68					
21	Complete Installation of MASTS and PERISCOPES	Sep 68					
22	Load Core	Nov 68					
23	Main Turbines 1st Run	Dec 68					
24	Criticality	Mar 69					
25	CSTs	May 69					
		1964	1965	1966	1967	1968	1969

Classification RESTRICTED

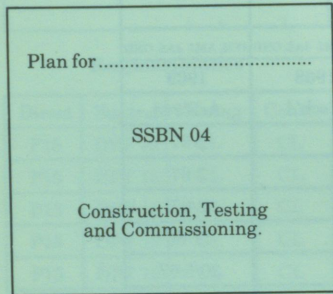
P10/4

Chart 2

How the Programme Management Plan is constructed

The first part of the PMP is the **TITLE**. The **TITLE** contains a brief but accurate description of the **TASK** covered by the PMP:

Chart P10/4



The next part of the PMP delineates the **MAJOR COMPONENTS** of the **TASK** described in the **TITLE** of the PMP:

PROGRAMME MANAGEMENT PLAN - LONG TERM

December, 1967

Classification RESTRICTED

MAJOR COMPONENTS	1964	1965	1966	1967	1968	1969
	JFM, AMJ, JAS, OND	JFM, AMJ, JAS, OND	JFM, AMJ, JAS, OND	JFM, AMJ, JAS, OND	JFM, AMJ, JAS, OND	JFM, AMJ, JAS, OND
HULL CONSTRUCTION						
HULL SERVICES AND OUTFIT						
MACHINERY INSTALLATION						
ELECTRICAL INSTALLATION						
SONAR AND TORPEDO EQUIPMENT INSTALLATIONS						
POLARIS SYSTEM INSTALLATION						
TESTING						
	JFM, AMJ, JAS, OND	JFM, AMJ, JAS, OND	JFM, AMJ, JAS, OND	JFM, AMJ, JAS, OND	JFM, AMJ, JAS, OND	JFM, AMJ, JAS, OND

MAJOR COMPONENTS represent general areas of work, or they may refer to particular sub-systems of the **TASK**. They are shown against time in such a way that they indicate a division into major types of work.

Thirdly, the PMP contains a list of MILESTONES. Each of these MILESTONES identifies some key event that must occur before the TASK outlined in the TITLE can be accomplished:

ACTION MILESTONES		1964	1965	1966	1967	1968	1969
					For'cst	R'sch'd	Ach'ved
1	▽○ Third Missile Unit to Berth	Nov 66					2/67
2	▽○ Accomdn Unit No. 1 (Hull Unit 10) to Berth Position	Dec 66					2/67
3	▽○ Accomdn Unit No. 2 (Hull Unit 11) to Berth Position	Dec 66					2/67
4	☆ Complete Sonar Array on Jig	Jan 67					11/66
5	▽○ Torpedo Compartment to Berth	Mar 67					30/5/67
6	▽○ Fore End Construction to Berth	Mar 67					16/6/67
7	▽○ Complete Shaft Bore	May 67					7/67
8	○ Ship Reactor Pressure Vessel	Sep 67					28/9/67
9	○ Complete Installation of Main Switchboard	Sep 67					
10	Complete Shielding ECT Closer	Dec 67					
11	○ Complete Final Checking of Sonar 2001 Array	Dec 67					
12	Complete Welding Primary Circuit	Feb 68					
13	Final Sight Torpedo Equipment	Feb 68					
14	Start Instal Launch Tubes	Mar 68					
15	Launch	Mar 68					
16	Complete Pulling Main Cables	May 68					
17	Complete Phase 2 Fire Control Testing	Jun 68					
18	Complete MCC Air Balance	Jul 68					
19	Missile Hydraulics Complete	Jul 68					
20	Initial Fill	Aug 68					
21	Complete Installation of MASTS and PERISCOPES	Sep 68					
22	Load Core	Nov 68					
23	Main Turbines 1st Run	Dec 68					
24	Criticality	Mar 69					
25	CSTs	May 69					
		1964	1965	1966	1967	1968	1969

A MILESTONE usually identifies the beginning or the completion of a part of the TASK. In general, the completion of an activity has been found to be a more useful MILESTONE than the beginning of an activity in helping management control the accomplishment of the TASK. Other events vital to the programme may also constitute valid MILESTONES. The selection of MILESTONES is the most important activity in PMP preparation. This process of selection encourages programme planning which is both timely and comprehensive. MILESTONES wisely chosen can be of significant aid in programme control by helping 'management by exception'.

Next to each MILESTONE on the PMP is noted the planned DATE OF ACHIEVEMENT. MILESTONES should be arranged in chronological order. To the right of the MILESTONE appears the TIME LINE, which enables quick reference to those MILESTONES that should be completed at any point in time. The last three columns should be headed up 'FORECAST', 'RESCHEDULED' and 'ACHIEVED' respectively. Revised dates should be entered in columns 1 or 2 when management decides that the original dates have become unrealistic. The ACHIEVED date column need only be completed when the actual date of achievement differs from the planned date. To the left of the MILESTONES spaces are left for MILESTONE STATUS SIGNALS. These signals, entered when appropriate, are shown to the right of the chart above.

- ☆ (blue) MILESTONES achieved ahead of schedule.
- (green) MILESTONES achieved on schedule.
- (orange) MILESTONES not expected to be achieved on schedule.
- ▽ (red) MILESTONES missed.
- ▽ MILESTONES achieved late.

Chart 3

The types of responsibility described

Finally, each PMP contains a list of RESPONSIBILITIES, four for each MILESTONE:

Responsibilities

Direct	Suptng	Montng	Contr
P15	DPT 10	CL	CL
P15	DPT 10	CL	CL
P15	DPT 10	CL	CL
P15	DPT 10	CL	CL
P15	DPT 10	CL	CL
P15	DPT 10	CL	CL
P15	DPT 10	CL	CL
P13	DPT 6	CL	CL
P13	DPT 3	CL	CL
P16	DPT 16	CL	CL
P15	DPT 10	CL	CL
P15	DPT 10	CL	CL
P13	DPT 18	CL	CL
P15	DPT 10	CL	CL
P15	DPT 10	CL	CL
P10	DPT 10	CL	CL
P16	DPT 16	CL	CL
P11	P111	CL	CL
P15	DPT 10	CL	CL
P15	DPT 10	CL	CL
P13	DPT 18	CL	CL
P15	DPT 10	CL	CL
P13	DPT 3	CL	CL
P13	DPT 6	CL	CL
P13	DPT 3	CL	CL
P10	DPT 10	Various	CL

Classification RESTRICTED

These RESPONSIBILITIES are defined as follows:-

- DIRECT** - The person within the Polaris Executive charged with the job of seeing that the MILESTONE is achieved. *Note:* In some cases it might be necessary to show here a section rather than an individual.
- SUPPORTING** - The person or organisation within or outside the Polaris Executive whose assistance is essential for the accomplishment of the MILESTONE.
- MONITORING** - The person or organisation within or outside the Polaris Executive who cannot get on with his own tasks until the MILESTONE is achieved.
- CONTRACTOR** - The organisation which performs the actual work necessary to achieve the MILESTONE.

These four RESPONSIBILITIES for each MILESTONE enable management at any level to pinpoint responsibility for any phase of the TASK described in the TITLE.

The symbol VAR should not be used in the RESPONSIBILITIES columns. All the responsible authorities or individuals should be listed, either on the form or on a separate sheet of paper. Where possible a co-ordinating authority should be agreed and identified by the PMP sponsor when "multiple responsibilities" are likely to occur.

In joint US/UK PMP's milestone responsibility will normally be designated as 'AC(P)', 'SPRN', 'SP Branch' or 'US Contractor' only, the appropriate staff officer within each authority being a matter of internal organisation. But where the PMP sponsor is able to pinpoint responsibility within these authorities with accuracy, he should do so.

APPENDIX V

Bibliography

This Bibliography is selective, in the sense that it concentrates upon publications that have been referred to, or are directly relevant to, the text; but it is also intended to offer a guide to further reading.

Official publications

- Cmnd. 537 Agreement for Cooperation on the Uses of Atomic Energy for Mutual Defence Purposes.
- Cmnd. 859 Amendment to Agreement for Cooperation on the Uses of Atomic Energy for Mutual Defence Purposes, of July 3, 1958.
- Cmnd. 1915 Joint Communique and Statement on Nuclear Defence Systems, December 1962.
- Cmnd. 1995 Polaris Sales Agreement April, 1963.
- Cmnd. 2937 Shipbuilding Inquiry Committee, 1965–1966, Report.
- H.C. 213 Second Report from the Select Committee on Science and Technology. Defence Research of the Steering Group on Development Cost Estimating; London: HMSO, 1969.
- Cmnd. 4641 Government Organization for Defence Procurement and Civil Aerospace; 1971.
- H.C. 399 Expenditure Committee: Twelfth Report, 1972–3 *Nuclear Weapons Programme*. 19 July 1973.

Books and Theses

- BARTLETT, C. J. *The Long Retreat*; London, Macmillan, 1972.
- BAYLIS, J. *Anglo-American Defence Relations 1939–80: The Special Relationship*; London, Macmillan, 1981.
- BEARD, E. *Developing the ICBM*; New York, Columbia U.P., 1976.

- BUCHAN, A. F. *NATO in the 1960s*; London, Chatto and Windus (revised edition) 1963.
- BURNS, T. and STALKER, G. *The Management of Innovation*; London, Tavistock, 1961.
- COULAM, R. E. *Illusions of Choice*; Princeton, Princeton U.P., 1977.
- CROWE, W. J. *The Policy Roots of the Modern Royal Navy, 1946–63* (Ph.D., Dissertation, Princeton University, 1965).
- DILLON G. M. *Dependence and Deterrence*, Aldershot, Gower, 1983.
- DRIVER, C. *The Disarmers, a study in protest*; London, Hodder and Stoughton, 1964.
- ENTHOVEN, A. C. and SMITH, K. W. *How Much Is Enough?*; New York, Harper and Row, 1971.
- FREEDMAN, L. W. *Britain and Nuclear Weapons*; London, Macmillan, 1980.
- GOWING, M. *Britain and Atomic Energy, 1939–45*; London, Macmillan, 1964.
- GOWING, M. *Independence and Deterrence*; London, Macmillan, 1974 (2 volumes).
- GREENWOOD, T. *Making the MIRV*, Cambridge, Mass, Ballinger, 1975.
- GROOM, A. J. R. *British Thinking About Nuclear Weapons*; London, Frances Pinter, 1974.
- HEWLETT, R. G. and DUNCAN, F. *Nuclear Navy, 1945–62*; London, University of Chicago Press, 1974.
- HUNTER, R. E. *Politics and Polaris: The Special Projects Office of the Navy as a Political Phenomenon*; Wesleyan University, June, 1962 (B.A. Thesis).
- KINGDON, D. R. *Matrix Organisation: Managing Information Technologies*; London, Tavistock, 1973.
- LAWRENCE, P. R. and LORSCH, J. W. *Organisation and Environment: Managing Differentiation and Integration*; Boston, Harvard University Division of Research Graduate School of British Administration, 1967.
- MACMILLAN, H. *At the End of the Day*; London, Macmillan, 1973.
- McGEOCH, I. *The British POLARIS Project*; Edinburgh University, 1975 (M.Phil. thesis).
- MENDL, W. *Deterrence and Persuasion, French Nuclear Armament in the Context of National Policy, 1945–69*; London, Faber and Faber, 1970.
- NEUSTADT, R. E. *Alliance Politics*; New York, Columbia U.P., 1970.
- PIERRE, A. J. *Nuclear Politics*; London, O.U.P., 1972.
- ROSECRANCE, R. N. *Defense of the Realm*; London, Columbia U.P., 1968.
- SANDERS, D. *The Politics of Defense Analysis*; New York, Dunellan, 1973.
- SAPOLSKY, H. M. *The Polaris System Development*; Cambridge, Mass., Harvard U.P., 1972.
- SAYLES, L. R. and CHANDLER, M. K. *Managing Large Systems: Organisations for the future*; New York, Harper & Row, 1971.

- SELZNICK, P. *Leadership in Administration*; New York, Harper and Row, 1957.
- SIMON, H. A. *The Sciences of the Artificial*; Cambridge, Mass., M.I.T. Press, 1969.
- SPIERS, M. *Techniques and Public Administration*; London, Fontana, 1973.
- STEINBRUNER, J. D. *The Cybernetic Theory of Decision*, Princeton, Princeton U.P., 1974.
- VICKERS, Sir Geoffrey *Making Institutions Work*; London, Associated Business Programmes, 1973.
- WILSON, H. *Labour Government, 1964-70; A Personal Record*; London, Michael Joseph and Weidenfeld and Nicolson, 1971.
- WOODWARD, J. *Industrial Organization: Theory and Practice*; London, Oxford U.P., 1968.
- ZUCKERMAN, S. *Nuclear Illusion and Reality*; London, Collins, 1982.

Reports and Pamphlets

- BEATON, L. The Western Alliance and the McNamara Doctrine (Adelphi Paper No. 11); London, Institute for Strategic Studies, 1964.
- BOW GROUP, Conservative Party. Stability and Survival, a Bow Group Discussion about Defence Policy; London, Bow Group, 1961.
- BUCHAN, A. F. The Multilateral Force, an historical perspective (Adelphi Paper No. 13); London, Institute for Strategic Studies, 1964.
- DE WEERD, H. A. The Labour Party and Unilateralism; RAND Memorandum, RM2914-PR, 1962.
- ECONOMIST "Polaris Submarines: a surprising amount of fall-out"; 20 April 1968.
- HUGHES, E. Polaris and The Arms Race; London, Fabian Society, 1965.
- KEMP, G. Nuclear Forces for Medium Powers (Adelphi Papers 106-107); London, International Institute for Strategic Studies, 1974.
- MARTIN, L. W. British Defence Policy: The Long Recessional (Adelphi Paper No. 61); London, Institute for Strategic Studies, 1969.
- NUCLEAR ENERGY. The Polaris Submarine Programme; November-December 1967.
- SHIPBUILDING AND SHIPPING RECORD. "RESOLUTION: first Polaris missile submarine for the Royal Navy"; 19 September 1967.
- SMART, I. Future Conditional: the Prospect for Anglo French Nuclear Cooperation (Adelphi Paper No. 78); London, Institute for Strategic Studies, 1971.
- WELDING AND METAL FABRICATION. "Modernisation at Cammell Laird", July 1963.

Articles and Periodicals

- ARMSTRONG, W. E. I. and FEAZEY, M. J. Shipyard reconstructed for Polaris Submarines: *The Dock and Harbour Authority* (Vol. XLVIII) No. 569, March 1958.
- BEATON, L. Facts about Skybolt: *New Scientist* (No. 275), 22 February 1962, pp. 430-1.
- BRANDON, H. SKYBOLT, the full inside story of how a missile nearly split the West: *The Sunday Times*, 8 December 1963.
- BROWN, N. Britain's Strategic Weapons: (1) Manned Bombers, (2) The Polaris A3: *The World Today*, Vol. XX, July-August 1964, pp. 293-8, 358-64.
- BUCHAN, A. F. Nassau Reconsidered: *New Republic*, 2 March 1963.
- FELD, T. F. Britain's deterrent and the Decision to Abandon the Blue Streak Missile: *NATO's Fifteen Nations*, February-March 1962, pp. 27-31.
- GORDON WALKER, P. C. The Labour Party's Defence and Foreign Policy: *Foreign Affairs*, Vol. XLII(3), April 1964, pp. 391-8.
- HUNTER, E. H. Quality Control for a POLARIS Submarine: *Welding and Metal Fabrication* (Vol. 35), November 1967.
- MARTIN, L. W. The Market for Strategic Ideas in Britain: The Sandys Era: *American Political Science Review*, Vol. LV(i), 1962, pp. 23-41.
- NEUSTADT, R. E. Memorandum on the British Labour Party and the MLF: *New York Review of Books*, Vol. XI(10), 5 December 1958, pp. 37-46.
- SHEPHERD, Captain C. W. H. "The United Kingdom Polaris Project": *Journal of the Royal Aeronautical Society*, (Vol. 70), September 1966.
- SIMPSON, J. "The Polaris Executive". A Case Study of a Unified Hierarchy, *Public Administration*, Vol. 48, Winter 1978.
- SIMPSON, J. Lessons of the British Polaris Project: An Organisational History. *Journal of the Royal United Services Institution*, March 1969, pp. 46-50.
- TABB, H. J. and WARREN, S. A. T. Quality Control Applied to Nuclear Submarine Construction: *Royal Institute of Naval Architects Quarterly Transactions*, Vol. 108, July 1966.
- TABB, H. J. and WARREN, S. A. T. Quality Control Applied to Nuclear Submarine Construction: *Shipping World and Shipbuilder*, 16 July 1967.
- WEALLANS, J. W. and ALLEN, B. Towards Automating the TIG Welding Process: *Welding and Metal Fabrication*, (Vol. 37), March 1969.
- WHITESTONE, N. E. Progress with Polaris: *Brassey's Annual*, London, 1966 (pp. 129-134).