

第 47/2012 號行政長官公告

Aviso do Chefe do Executivo n.º 47/2012

經聯合國安全理事會第1718（2006）號決議設立的制裁朝鮮委員會透過二零一二年四月十八日第S/2012/235號文件更新了二零零九年四月十五日第S/2009/205號文件所列的與彈道導彈方案有關的物項、材料、設備、貨物 and 技術清單；

二零一二年五月二日，上指制裁委員會更新了受到經第1874（2009）號決議修正的第1718（2006）號決議第8段措施制約的實體、貨物 and 個人清單；

基於此，按照中央人民政府的命令，行政長官根據澳門特別行政區第3/1999號法律第六條第一款的規定，命令公佈：

——經第S/2012/235號文件更新的與彈道導彈方案有關的物項、材料、設備、貨物 and 技術清單的中文及英文原文；

——二零一二年五月二日更新的、受到經第1874（2009）號決議修正的第1718（2006）號決議第8段措施制約的實體、貨物 and 個人清單的英文原文及葡文譯本。

二零一二年九月五日發佈。

行政長官 崔世安

與彈道導彈方案有關的
物項、材料、設備、貨物 and 技術清單

導言、定義、術語

1. 導言

(a) 此附件包括兩類物項，含設備、材料、“軟件”或“技術”。第一類物項均列於附件第1項 and 第2項，這類物項具有最高敏感性。如果某一系統包含屬於第一類的一物項，除非該物項無法從該系統中分離、移開 or 複製，否則該系統亦列為第一類管制。附件中沒有列為第一類的物項，均為第二類物項。

(b) 對第1項 and 第19項有關完整火箭 and 無人駕駛航空飛行器系統及技術附件所列可能會用於此種系統的設備、材料、“軟件” or “技術”的轉移申請進行審查時，政府應考量其“射程”與“有效載荷”交互效應的能力。

(c) 一般技術註釋：

與附件中所管制產品直接相關的“技術”之轉移，應依照國家立法所許可範圍內對各物項之規定予以管制。附件所列任

Considering que o Comité de Sanções contra a Coreia do Norte, estabelecido pela Resolução n.º 1718 (2006) do Conselho de Segurança das Nações Unidas, procedeu, através do documento S/2012/235 de 18 de Abril de 2012, a uma actualização da lista dos artigos, materiais, equipamento, bens e tecnologia relacionados com programas de mísseis balísticos, enumerados no documento S/2009/205 de 15 de Abril de 2009;

Considerando ainda que, em 2 de Maio de 2012, o referido Comité de Sanções procedeu a uma actualização da lista das entidades, bens e pessoas singulares sujeitos às medidas impostas no n.º 8 da Resolução n.º 1718 (2006), tal como modificada pela Resolução n.º 1874 (2009);

O Chefe do Executivo manda publicar, nos termos do n.º 1 do artigo 6.º da Lei n.º 3/1999 da Região Administrativa Especial de Macau, por ordem do Governo Popular Central,

— a lista dos artigos, materiais, equipamento, bens e tecnologia relacionados com programas de mísseis balísticos, tal como actualizada no documento S/2012/235, nas suas versões originais em línguas chinesa e inglesa;

— a lista das entidades, bens e pessoas singulares sujeitos às medidas impostas no n.º 8 da Resolução n.º 1718 (2006), tal como modificada pela Resolução n.º 1874 (2009), actualizada à data de 2 de Maio de 2012, na sua versão original em língua inglesa, acompanhada da tradução para a língua portuguesa.

Promulgado em 5 de Setembro de 2012.

O Chefe do Executivo, *Chui Sai On*.

Items, materials, equipment, goods and technology
related to ballistic missile programmes
Introduction, definitions, terminology

1. INTRODUCTION

(a) This Annex consists of two categories of items, which term includes equipment, materials, “software” or “technology”. Category I items, all of which are in Annex Items 1 and 2, are those items of greatest sensitivity. If a Category I item is included in a system, that system will also be considered as Category I, except when the incorporated item cannot be separated, removed or duplicated. Category II items are those items in the Annex not designated Category I.

(b) In reviewing the proposed applications for transfers of complete rocket and unmanned aerial vehicle systems described in Items 1 and 19, and of equipment, materials, “software” or “technology” which is listed in the Technical Annex, for potential use in such systems, the Government will take account of the ability to trade off “range” and “payload”.

(c) **General Technology Note:**

The transfer of “technology” directly associated with any goods controlled in the Annex is controlled according to the provisions in each Item to the extent permitted by national legislation. The approval of any Annex item for export also author-

何物項如獲出口許可，即准予向最終用戶出口該物項安裝、操作、維護和修理所需最低“技術”。

註：

本管制並不適用於“公開領域”“技術”或“基礎科學研究”。

(d) 一般軟件註釋：

本附件對下列“軟件”不予管制：

1. 以下列途徑供應大眾的軟件：

a. 由不受限制的零售點銷售的庫存品，交貨方式如下：

1. 櫃檯交易；
2. 郵購交易；或
3. 電話交易；及

b. 設計為用戶自行安裝、不需供貨商進一步提供很多支持的軟件，或

2. “屬公開領域”的軟件。

註：

“一般軟件註釋”僅適用於一般用途、大眾市場的“軟件”。

(e) 化學文摘社 (CAS) 號碼：

在一些情況下，化學品按名稱和CAS號碼列出。結構式相同的化學品（包括水合物），無論其名稱和CAS號碼為何，均受管制。CAS號碼用於幫助確定某一化學品或聚合物是否受管制，無論名稱為何。CAS號碼不能用作獨特標識，因為所列化學品的某些形式具有不同的CAS號碼，包含所列某一化學品的聚合物也可以有不同的CAS號碼。

2. 定義

本附件採用下列定義：

“準確度”

通常以誤差度來衡量準確度，即某一指示值同認可標準值或真值最大正負偏差。

“基礎科學研究”

主要為獲得現象和可觀察到的事實的基本原理的新知識而從事的實驗性或理論性工作，此類工作主要不是針對某一具體的實際目的或目標。

izes the export to the same end-user of the minimum “technology” required for the installation, operation, maintenance, or repair of the item.

Note:

Controls do not apply to “technology” “in the public domain” or to “basic scientific research”.

(d) General Software Note:

The Annex does not control “software” which is either:

1. Generally available to the public by being:

a. Sold from stock at retail selling points without restriction, by means of:

1. Over-the-counter transactions;
2. Mail order transactions; or
3. Telephone call transactions; and

b. Designed for installation by the user without further substantial support by the supplier; or

2. “In the public domain”.

Note:

The General Software Note only applies to general purpose, mass market “software”.

(e) Chemical Abstracts Service (CAS) Numbers:

In some instances chemicals are listed by name and CAS number. Chemicals of the same structural formula (including hydrates) are controlled regardless of name or CAS number.

CAS numbers are shown to assist in identifying whether a particular chemical or mixture is controlled, irrespective of nomenclature. CAS numbers cannot be used as unique identifiers because some forms of the listed chemical have different CAS numbers, and mixtures containing a listed chemical may also have different CAS numbers.

2. DEFINITIONS

For the purpose of this Annex, the following definitions apply:

“Accuracy”

Usually measured in terms of inaccuracy, means the maximum deviation, positive or negative, of an indicated value from an accepted standard or true value.

“Basic scientific research”

Experimental or theoretical work undertaken principally to acquire new knowledge of the fundamental principles of phenomena or observable facts, not primarily directed towards a specific practical aim or objective.

“研發”

指生產之前的所有階段，如：

- 設計
- 設計研究
- 設計分析
- 設計理念
- 樣機的裝配和測試
- 試生產方案
- 設計數據
- 把設計數據轉化為產品的工藝過程
- 結構設計
- 總體設計
- 平面設計

“公開領域”

指沒有傳播限制而可以自由獲得的“軟件”或“技術”（版權限制無礙“軟件”或“技術”在“公開領域”使用）。

“微電路”

一種具有電路功能的裝置，其中一群主、被動組件被認為彼此相聯，不可分割，或處於一連續結構上。

“微程序”

在特殊貯存器中保存的單元指令系列，指令的執行是由其參考指令緩存器之指示激活。

“有效載荷”

由特定火箭系統或非用來維持飛行的無人駕駛航空飛行器系統搭載或投送之總重量。

註：

有效載荷所包含的特定設備、次系統或組件視有關飛行器類型及配置而定。

技術註釋：

1. 彈道導彈

a. 對有可分離再入飛行器的系統而言，“有效載荷”包括：

1. 再入飛行器，包括：
 - a. 專用制導、導航及控制設備；

“Development”

Is related to all phases prior to “production” such as:

- design
- design research
- design analysis
- design concepts
- assembly and testing of prototypes
- pilot production schemes
- design data
- process of transforming design data into a product
- configuration design
- integration design
- layouts

“In the public domain”

This means “software” or “technology” which has been made available without restrictions upon its further dissemination. (Copyright restrictions do not remove “software” or “technology” from being “in the public domain”.)

“Microcircuit”

A device in which a number of passive and/or active elements are considered as indivisibly associated on or within a continuous structure to perform the function of a circuit.

“Microprogrammes”

A sequence of elementary instructions maintained in a special storage, the execution of which is initiated by the introduction of its reference instruction register.

“Payload”

The total mass that can be carried or delivered by the specified rocket system or unmanned aerial vehicle (UAV) system that is not used to maintain flight.

Note:

The particular equipment, subsystems, or components to be included in the “payload” depends on the type and configuration of the vehicle under consideration.

Technical Notes:

1. Ballistic Missiles

a. “Payload” for systems with separating re-entry vehicles (RVs) includes:

1. The RVs, including:

- a. Dedicated guidance, navigation, and control equipment;

b. 專用反制設備；

2. 任何類型的彈藥（如：爆裂物或非爆炸物）；

3. 可予拆除而不妨礙飛行器結構完整性的彈藥支撐結構及安放機制（如：用來使再入飛行器附着本體/後加力飛行器或與其分離的硬件）。

4. 保險、解保、引信或起爆機制及裝置；

5. 任何其他反制設備（如：誘標、干擾器或箔條投放器），可與再入飛行器本體/後加力飛行器分離；

6. 不包括在系統/次系統內、而對其他階段操作很重要之本體/後加力飛行器或姿態控制/速度調整模塊。

b. 對有非分離之再入飛行器的系統而言，“有效載荷”包括：

1. 任何類型的彈藥（如：爆裂物或非爆炸物）；

2. 可予拆除而不妨礙飛行器結構完整性的彈藥支撐結構及安放機制；

3. 保險、解保、引信或起爆機制及裝置；

4. 可予拆除而不妨礙飛行器結構完整性的任何其他反制設備（如：誘標、干擾器或箔條投放器）。

2. 航天運載火箭

“有效載荷”包括：

a. 衛星（單一或多個）；

b. 衛星發射器接合器，包括（如適用）遠地點/近地點踢進器或類似操縱系統。

3. 探空火箭

“有效載荷”包括：

a. 為獲取任務特定數據，如數據收集、記錄或發送等裝置之任務所需設備；

b. 可予拆除而不妨礙飛行器結構完整性的回收設備（如降落傘）。

4. 巡航導彈

“有效載荷”包括：

a. 任何類型的彈藥（如：爆裂物或非爆炸物）；

b. 可予拆除而不妨礙飛行器結構完整性的彈藥支撐結構及安放機制；

b. Dedicated countermeasures equipment;

2. Munitions of any type (e.g. explosive or non-explosive);

3. Supporting structures and deployment mechanisms for the munitions (e.g. hardware used to attach to, or separate the RV from, the bus/post-boost vehicle) that can be removed without violating the structural integrity of the vehicle;

4. Mechanisms and devices for safing, arming, fuzing or firing;

5. Any other countermeasures equipment (e.g. decoys, jammers or chaff dispensers) that separate from the RV bus/post-boost vehicle;

6. The bus/post-boost vehicle or attitude control/velocity trim module not including systems/subsystems essential to the operation of the other stages.

b. “Payload” for systems with non-separating re-entry vehicles includes:

1. Munitions of any type (e.g. explosive or non-explosive);

2. Supporting structures and deployment mechanisms for the munitions that can be removed without violating the structural integrity of the vehicle;

3. Mechanisms and devices for safing, arming, fuzing or firing;

4. Any countermeasures equipment (e.g. decoys, jammers or chaff dispensers) that can be removed without violating the structural integrity of the vehicle.

2. Space Launch Vehicles

“Payload” includes:

a. Satellites (single or multiple);

b. Satellite-to-launch vehicle adapters including, if applicable, apogee/perigee kick motors or similar manoeuvring systems.

3. Sounding Rockets

“Payload” includes:

a. Equipment required for a mission, such as data gathering, recording or transmitting devices for mission-specific data;

b. Recovery equipment (e.g. parachutes) that can be removed without violating the structural integrity of the vehicle.

4. Cruise Missiles

“Payload” includes:

a. Munitions of any type (e.g. explosive or non-explosive);

b. Supporting structures and deployment mechanisms for the munitions that can be removed without violating the structural integrity of the vehicle;

- c. 保險、解保、引信或起爆機制及裝置；
- d. 可予拆除而不妨礙飛行器結構完整性的反制設備（如：誘標、干擾器或箔條投放器）；
- e. 可予拆除而不妨礙飛行器結構完整性的特徵變換設備。
5. 其他無人駕駛航空飛行器
- “有效載荷”包括：
- a. 任何類型的彈藥（如：爆裂物或非爆物）；
- b. 保險、解保、引信或起爆機制及裝置；
- c. 可予拆除而不妨礙飛行器結構完整性的反制設備（如：誘標、干擾器或箔條投放器）；
- d. 可予拆除而不妨礙飛行器結構完整性的特徵變換設備；
- e. 為獲取任務特定數據，如數據收集、記錄或發送等裝置之任務所需設備以及可予拆除而不妨礙飛行器結構完整性的輔助結構；
- f. 可予拆除而不妨礙飛行器結構完整性的回收設備（如降落傘）；
- g. 可予拆除而不妨礙飛行器結構完整性的彈藥輔助結構和部署機制。

“生產”

是指所有的生產階段，諸如：

- 生產設計
- 製造
- 總成
- 裝配（安裝）
- 檢驗
- 測試
- 質量保證

“生產設備”

指工具、樣板、夾具、芯模、塑模、沖模、定位裝置、校準裝置、試驗設備以及其他機械和部件。這些設備只限於那些為“研製”或“生產”的一個或幾個階段而專門設計的設備。

“生產設施”

指在研製生產的一個或幾個階段中組成整套裝置的生產設備，以及為此專門設計的軟件。

c. Mechanisms and devices for safing, arming, fuzing or firing;

d. Countermeasures equipment (e.g. decoys, jammers or chaff dispensers) that can be removed without violating the structural integrity of the vehicle;

e. Signature alteration equipment that can be removed without violating the structural integrity of the vehicle.

5. Other UAVs

“Payload” includes:

a. Munitions of any type (e.g. explosive or non-explosive);

b. Mechanisms and devices for safing, arming, fuzing or firing;

c. Countermeasures equipment (e.g. decoys, jammers or chaff dispensers) that can be removed without violating the structural integrity of the vehicle;

d. Signature alteration equipment that can be removed without violating the structural integrity of the vehicle;

e. Equipment required for a mission such as data gathering, recording or transmitting devices for mission-specific data and supporting structures that can be removed without violating the structural integrity of the vehicle;

f. Recovery equipment (e.g. parachutes) that can be removed without violating the structural integrity of the vehicle;

g. Munitions supporting structures and deployment mechanisms that can be removed without violating the structural integrity of the vehicle.

“Production”

Means all production phases such as:

- production engineering
- manufacture
- integration
- assembly (mounting)
- inspection
- testing
- quality assurance

“Production equipment”

Means tooling, templates, jigs, mandrels, moulds, dies, fixtures, alignment mechanisms, test equipment, other machinery and components therefor, limited to those specially designed or modified for “development” or for one or more phases of “production”.

“Production facilities”

Means “production equipment” and specially designed “software” therefor integrated into installations for “development” or for one or more phases of “production”.

“程序”

以可由計算機執行的形式或以可轉換為由計算機執行的形式完成一流程的一系列指令。

“抗輻射加固”

指經設計或被評等為可以承受輻射程度達到或超過總輻射量 5×10^5 雷德（矽偵檢劑）的組件或設備。

“射/航程”

特定火箭系統或無人駕駛航空飛行器系統在穩定飛行中能夠飛行的最大距離，以其飛行軌跡投射在地球表面上之距離量度。

技術註釋：

1. 在判定“射/航程”時，將以系統設計特性於裝滿燃料或推進劑之最大能力為基本考量。

2. 火箭系統及無人駕駛航空飛行器之“射/航程”判定，將不考慮任何外在因素，諸如作業限制、遙測、數據鏈或其他外在約束之限制。

3. 火箭系統的“射程”將假設在國際民航組織標準大氣壓及無風狀態下，所達最大射程之彈道予以判定。

4. 無人駕駛航空飛行器的“航程”將假設在國際民航組織標準大氣壓及無風狀態下，以最高燃油效率（如：巡航速度及高度）所達單程距離判定。

“軟件”

固定於任何表達形式之有形介質中的一個或多個“程序”或“微程序”的集合。

“技術”

指“研製”、“生產”或“使用”某一產品而需要的特別信息。這種信息形式可能是“技術資料”或“技術援助”：

“技術援助”

可為下列形式：

——技術指導

——技能

——培訓

——實踐經驗

——諮詢服務

“Programmes”

A sequence of instructions to carry out a process in, or convertible into, a form executable by an electronic computer.

“Radiation hardened”

Means that the component or equipment is designed or rated to withstand radiation levels which meet or exceed a total irradiation dose of 5×10^5 rads (Si).

“Range”

The maximum distance that the specified rocket system or unmanned aerial vehicle (UAV) system is capable of travelling in the mode of stable flight as measured by the projection of its trajectory over the surface of the Earth.

Technical Notes:

1. The maximum capability based on the design characteristics of the system, when fully loaded with fuel or propellant, will be taken into consideration in determining “range”.

2. The “range” for both rocket systems and UAV systems will be determined independently of any external factors such as operational restrictions, limitations imposed by telemetry, data links or other external constraints.

3. For rocket systems, the “range” will be determined using the trajectory that maximises “range”, assuming ICAO standard atmosphere with zero wind.

4. For UAV systems, the “range” will be determined for a one-way distance using the most fuelefficient flight profile (e.g. cruise speed and altitude), assuming ICAO standard atmosphere with zero wind.

“Software”

A collection of one or more “programmes”, or “micro-programmes”, fixed in any tangible medium of expression.

“Technology”

Means specific information which is required for the “development”, “production” or “use” of a product. The information may take the form of “technical data” or “technical assistance”.

“Technical assistance”

May take forms such as:

— instruction

— skills

— training

— working knowledge

— consulting services

“技術資料”

“Technical data”

可為下列形式：

May take forms such as:

—— 藍圖

— blueprints

—— 計劃

— plans

—— 圖表

— diagrams

—— 模型

— models

—— 公式

— formulae

—— 工程設計和規格

— engineering designs and specifications

—— 書寫或記錄在其他介質或裝置上的手冊和說明書，諸

— manuals and instructions written or recorded on other media or devices such as:

如：

— disk

—— 磁盤

— tape

—— 磁帶

— read-only memories

—— 只讀存儲器

“Use”

“使用”

Means:

意指：

— operation

—— 操作

— installation (including on-site installation)

—— 安裝（包括現場安裝）

— maintenance

—— 維護

— repair

—— 修理

— overhaul

—— 大修

— refurbishing

—— 翻修

3. TERMINOLOGY

3. 術語

文中出現術語解釋如下：

Where the following terms appear in the text, they are to be understood according to the explanations below:

(a) “專門設計” (Specially Designed) 意指經“研製”的某設備、零件、組件或“軟件”具有某種預定用途的獨特性質。例如：“專門設計”用於導彈的設備，如無任何其他功能或用途，則只能視為“專門設計”的設備。又如，為生產某一類型組件而“專門設計”的製造設備，如不能生產其他類型組件，則只能視為“專門設計”的設備。

(a) “Specially designed” describes equipment, parts, components, materials or “software” which, as a result of “development”, have unique properties that distinguish them for certain predetermined purposes. For example, a piece of equipment that is “specially designed” for use in a missile will only be considered so if it has no other function or use. Similarly, a piece of manufacturing equipment that is “specially designed” to produce a certain type of component will only be considered such if it is not capable of producing other types of components.

(b) “設計或改進” (Designed or Modified) 意指“研製”或修改後的設備、零件、組件或軟件適合於特別用途的特定性質。例如：為導彈使用而設計的鍍鈦泵除可使用推進劑外，也能使用腐蝕性液體。

(b) “Designed or modified” describes equipment, parts or components which, as a result of “development,” or modification, have specified properties that make them fit for a particular application. “Designed or modified” equipment, parts, components or “software” can be used for other applications. For example, a titanium coated pump designed for a missile may be used with corrosive fluids other than propellants.

(c) “使用在” (usable in) 或 “能夠” (capable of) 意指設備、零件、組件或軟件適用於某特定用途。這些設備、零件、組件或“軟件”毋需經過特別的配置、修改或特別調整就能適用於該特別用途。例如：任何軍事規格的記憶電路均“能夠”用於制導系統的操作。

(d) “軟件”的“改進”，意指有意改變“軟件”，使其適用特定目的或應用之性質。其特性亦能使之適用其他非目的應用。

第一類；第 1 項

第一類

第1項 完整運載系統

1.A. 設備、裝配及組件

1.A.1. 能把500公斤以上有效載荷投擲到300公里以上的完整火箭系統（包含彈道導彈系統、航天運載火箭、探空火箭）。

1.A.2. 能把500公斤以上有效載荷投擲到300公里以上的完整無人駕駛航空飛行器系統（包含巡航導彈系統、靶機及無人駕駛偵察機）。

1.B. 測試及生產設備

1.B.1. 為1.A.中所述系統而專門設計的“生產設施”。

1.C. 材料

無。

1.D. 軟件

1.D.1. 為1.B.中所述“生產設施”的“使用”而專門設計或改進的“軟件”。

1.D.2. 為“使用”於1.A.所述系統而專門設計或修改能協調一個以上次系統功能的“軟件”。

1.E. 技術

1.E.1. 依照“一般技術註釋”，指1.A.、1.B.或1.D.中所述設備或“軟件”的“研製”、“生產”或“使用”的“技術”。

第一類；第 2 項

第2項 可用於完整運載系統的完整次系統

2.A. 設備、裝配及組件

2.A.1. 可用於1.A.所述系統的完整次系統，如下：

a. 可用於1.A.所述系統的火箭的各級；

(c) “Usable in”, “usable for”, “usable as” or “capable of” describes equipment, parts, components, materials or “software” which are suitable for a particular purpose. There is no need for the equipment, parts, components or “software” to have been configured, modified or specified for the particular purpose. For example, any military specification memory circuit would be “capable of” operation in a guidance system.

(d) “Modified” in the context of “software” describes “software” which has been intentionally changed such that it has properties that make it fit for specified purposes or applications. Its properties may also make it suitable for purposes or applications other than those for which it was “modified”.

Category I; Item 1

CATEGORY I

ITEM 1 COMPLETE DELIVERY SYSTEMS

1.A. EQUIPMENT, ASSEMBLIES AND COMPONENTS

1.A.1. Complete rocket systems (including ballistic missile systems, space launch vehicles, and sounding rockets) capable of delivering at least a 500 kg “payload” to a “range” of at least 300 km.

1.A.2. Complete unmanned aerial vehicle systems (including cruise missile systems, target drones and reconnaissance drones) capable of delivering at least a 500 kg “payload” to a “range” of at least 300 km.

1.B. TEST AND PRODUCTION EQUIPMENT

1.B.1. “Production facilities” specially designed for the systems specified in 1.A.

1.C. MATERIALS

None.

1.D. SOFTWARE

1.D.1. “Software” specially designed or modified for the “use” of “production facilities” specified in 1.B.

1.D.2. “Software” which coordinates the function of more than one subsystem, specially designed or modified for “use” in systems specified in 1.A.

1.E. TECHNOLOGY

1.E.1. “Technology”, in accordance with the General Technology Note, for the “development”, “production” or “use” of equipment or “software” specified in 1.A., 1.B., or 1.D.

Category I; Item 2

ITEM 2 COMPLETE SUBSYSTEMS USABLE FOR COMPLETE DELIVERY SYSTEMS

2.A. EQUIPMENT, ASSEMBLIES AND COMPONENTS

2.A.1. Complete subsystems usable in the systems specified in 1.A., as follows:

a. Individual rocket stages usable in the systems specified in 1.A.;

b. 再入飛行器及下列經專門設計或修改、可用於1.A.所述系統的設備，但2.A.1.的註釋所述用於運載非武器的除外：

1. 以陶瓷材料或燒蝕防熱材料製成的防熱護罩及其組件；
2. 質輕、高熱容材料製成的熱散體及其組件；
3. 為再入飛行器專門設計的電子設備；

c. 可用於1.A.所述系統、總沖大於或等於1100千牛頓·秒的固體或液體推進火箭發動機；

註：

2.A.1.c.所述為衛星用途設計或修改的液體推進劑遠程發動機和定位引擎，若出口需有最終用戶說明，且對例外的最終用戶有適當的數量限制，真空推力不大於1kN，均可視為第二類物項予以處理。

d. 可用於1.A.所述系統、系統精度為射程的3.33%以內（亦即射程在300公里時，圓公算偏差等於或小於10公里）的“制導裝置”，但如2.A.1.項的註釋所述，為射程300公里以下的導彈或是有人駕駛飛機專門設計的制導裝置不在此列。

技術註釋：

1. “制導裝置”將量度計算飛行器位置及速度的程序（即導航）與計算和下達指令至飛行器的飛行控制系統的程序二者加以整合，以修正飛行軌道。

2. 圓公算偏差（CEP）用以衡量精度，係指以目標為圓心至50%的有效載荷在特定射程內著陸點的半徑。

e. 可用於1.A.所述系統的推力矢量控制次系統；但若該次系統的設計不超過1.A.所述火箭系統航程及有效載荷能力，且符合2.A.1.的註釋中的規定，則不在此列。

技術註釋：

2.A.1.e.包括下列可達推力矢量控制方法：

- a. 活動噴嘴；
- b. 流體或次氣體噴注；
- c. 可移式發動機或發動機噴嘴；
- d. 排氣噴流偏折（噴射導片或探針）；
- e. 利用推力導片。

f. 可用於1.A.所述系統的武器或彈頭的保險、解保、引信或起爆裝置；但該裝置若是依第2.A.1.項的註釋的規定，不是為1.A.所述系統設計，則不在此列。

b. Re-entry vehicles, and equipment designed or modified therefor, usable in the systems specified in 1.A., as follows, except as provided in the Note below 2.A.1. for those designed for non-weapon payloads:

1. Heat shields, and components therefor, fabricated of ceramic or ablative materials;
2. Heat sinks and components therefor, fabricated of light-weight, high heat capacity materials;
3. Electronic equipment specially designed for re-entry vehicles;

c. Solid propellant rocket motors, hybrid rocket motors or liquid propellant rocket engines, usable in the systems specified in 1.A., having a total impulse capacity equal to or greater than 1.1×10^6 Ns;

Note:

Liquid propellant apogee engines and station-keeping engines specified in 2.A.1.c., designed or modified for use on satellites, may be treated as Category II, if the subsystem is exported subject to end-use statements and quantity limits appropriate for the excepted end-use stated above, when having a vacuum thrust not greater than 1kN.

d. ‘Guidance sets’, usable in the systems specified in 1.A., capable of achieving system accuracy of 3.33% or less of the “range” (e.g. a ‘CEP’ of 10 km or less at a “range” of 300 km), except as provided in the Note below 2.A.1. for those designed for missiles with a “range” under 300 km or manned aircraft;

Technical Notes:

1. A ‘guidance set’ integrates the process of measuring and computing a vehicle’s position and velocity (i.e. navigation) with that of computing and sending commands to the vehicle’s flight control systems to correct the trajectory.

2. ‘CEP’ (circle of equal probability) is a measure of accuracy, defined as the radius of the circle centred at the target, at a specific range, in which 50% of the payloads impact.

e. Thrust vector control sub-systems, usable in the systems specified in 1.A., except as provided in the Note below 2.A.1. for those designed for rocket systems that do not exceed the “range”/“payload” capability of systems specified in 1.A.;

Technical Note:

2.A.1.e. includes the following methods of achieving thrust vector control:

- a. Flexible nozzle;
- b. Fluid or secondary gas injection;
- c. Movable engine or nozzle;
- d. Deflection of exhaust gas stream (jet vanes or probes);
- e. Use of thrust tabs.

f. Weapon or warhead safing, arming, fuzing, and firing mechanisms, usable in the systems specified in 1.A., except as provided in the Note below 2.A.1. for those designed for systems other than those specified in 1.A.

註：

若次系統的出口需有最終用戶說明，且對上述例外最終用戶需有適當數量限制，則上述2.A.1.b、2.A.1.d、2.A.1.e及2.A.1.f中的例外情況可作為第二類處理。

2.B. 測試及生產設備

2.B.1. 為2.A.所述次系統而專門設計的“生產設施”。

2.B.2. 為2.A.中所述次系統而專門設計的“生產設備”。

2.C. 材料

無。

2.D. 軟件

2.D.1. 為2.B.1.中所述“生產設施”的“使用”而專門設計或改進的“軟件”。

2.D.2. 為“使用”於2.A.1.c.中所述火箭發動機或發動機而專門設計或改進的“軟件”。

2.D.3. 為“使用”於2.A.1.d.中所述“制導裝置”而專門設計或改進的“軟件”。

註：

2.D.3. 包括為增強“制導裝置”性能以達到或超過2.A.1.d.中所述精度而專門設計或改進的“軟件”。

2.D.4. 為“使用”於2.A.1.b.3.中所述次系統或設備而專門設計或改進的“軟件”。

2.D.5. 為“使用”於2.A.1.e.中所述系統而專門設計或改進的“軟件”。

2.D.6. 為“使用”於2.A.1.f.中所述系統而專門設計或改進的“軟件”。

註：

2.D.2.-2.D.6.所列“軟件”，需有適合於例外最終用戶的最終用戶說明，可作為第二類物項處理，說明如下：

1. 若為液體推進劑遠端發動機專門設計或改進，而該發動機如2.A.1.c.的註釋所述，是為衛星應用而設計或改進的，在2.D.2.之下處理；

2. 若為“射程”為300公里以下或有人駕駛飛機設計，在2.D.3.之下處理；

3. 若非為運載武器的再入飛行器專門設計或改進，在2.D.4.之下處理；

Note:

The exceptions in 2.A.1.b., 2.A.1.d., 2.A.1.e. and 2.A.1.f. above may be treated as Category II if the subsystem is exported subject to end-use statements and quantity limits appropriate for the excepted end-use stated above.

2.B. TEST AND PRODUCTION EQUIPMENT

2.B.1. “Production facilities” specially designed for the subsystems specified in 2.A.

2.B.2. “Production equipment” specially designed for the subsystems specified in 2.A.

2.C. MATERIALS

None.

2.D. SOFTWARE

2.D.1. “Software” specially designed or modified for the “use” of “production facilities” specified in 2.B.1.

2.D.2. “Software” specially designed or modified for the “use” of rocket motors or engines specified in 2.A.1.c.

2.D.3. “Software”, specially designed or modified for the “use” of ‘guidance sets’ specified in 2.A.1.d.

Note:

2.D.3. includes “software”, specially designed or modified to enhance the performance of ‘guidance sets’ to achieve or exceed the accuracy specified in 2.A.1.d.

2.D.4. “Software” specially designed or modified for the “use” of subsystems or equipment specified in 2.A.1.b.3.

2.D.5. “Software” specially designed or modified for the “use” of systems in 2.A.1.e.

2.D.6. “Software” specially designed or modified for the “use” of systems in 2.A.1.f.

Note:

Subject to end-use statements appropriate for the excepted end-use, “software” controlled by 2.D.2. — 2.D.6. may be treated as Category II as follows:

1. Under 2.D.2. if specially designed or modified for liquid propellant apogee engines, designed or modified for satellite applications as specified in the Note to 2.A.1.c.;

2. Under 2.D.3. if designed for missiles with a “range” of under 300 km or manned aircraft;

3. Under 2.D.4. if specially designed or modified for re-entry vehicles designed for non-weapon payloads;

4. 若為不超過1.A.所述系統“射/航程”和“有效載荷”能力的火箭系統設計，在2.D.5.之下處理；

5. 若為1.A.中沒有述及的系統設計，在2.D.6.之下處理。

2.E. 技術

2.E.1. 依照“一般技術註釋”，指2.A.、2.B.或2.D.中所述設備或“軟件”的“研製”、“生產”或“使用”的“技術”。

第二類；第3項

第二類

第3項 推進組件及設備

3.A. 設備、裝配及組件

3.A.1. 下述渦輪噴氣發動機和渦輪風扇發動機：

a. 具有下列兩個特性的發動機：

1. 最大推力值大於400牛頓（未安裝時），但最大推力值大於8.89千牛頓（未安裝時）的民用認證發動機除外；

2. 單位耗油率為0.15kg NI（含）以下（海平面靜態及標準情況下連續最大動力）；

b. 為1.A.或19.A.2.中述系統設計或修改的發動機，不論其推力或單位耗油率為何。

註：

3.A.1.中所述發動機可作為有人駕駛飛機部件或以有人駕駛飛機更換部件的適當數量出口。

3.A.2. 衝壓噴氣/超燃衝壓噴氣/脈衝噴氣/組合循環發動機，包括燃燒調節裝置，以及可用於1.A.或19.A.2.所述系統經專門設計的組件。

3.A.3. 可用於1.A.或19.A.1.所述系統的火箭發動機殼體、“絕熱”組件及噴嘴。

技術註釋：

在3.A.3.中，用於火箭發動機組件，如：殼體、噴嘴進氣道、外殼封蓋的“絕熱層”，包括內含絕熱或耐火物質之片狀柁托組成的熟化或半熟化之複合橡膠組件。此絕熱層亦可並用於消除應力襯邊或襟翼中。

註：

參考3.C.2.中成片狀或塊狀的“絕熱”材料。

4. Under 2.D.5. if designed for rocket systems that do not exceed the “range” “payload” capability of systems specified in 1.A.;

5. Under 2.D.6. if designed for systems other than those specified in 1.A.

2.E. TECHNOLOGY

2.E.1. “Technology”, in accordance with the General Technology Note, for the “development”, “production” or “use” of equipment or “software” specified in 2.A., 2.B. or 2.D.

Category II; Item 3

CATEGORY II

ITEM 3 PROPULSION COMPONENTS AND EQUIPMENT

3.A. EQUIPMENT, ASSEMBLIES AND COMPONENTS

3.A.1. Turbojet and turbofan engines, as follows:

a. Engines having both of the following characteristics:

1. Maximum thrust value greater than 400 N (achieved un-installed) excluding civil certified engines with a maximum thrust value greater than 8.89 kN (achieved uninstalled); and

2. Specific fuel consumption of 0.15 kg N⁻¹ h⁻¹ or less (at maximum continuous power at sea level static and standard conditions);

b. Engines designed or modified for systems specified in 1.A. or 19.A.2., regardless of thrust or specific fuel consumption.

Note:

Engines specified in 3.A.1. may be exported as part of a manned aircraft or in quantities appropriate for replacement parts for a manned aircraft.

3.A.2. Ramjet/scramjet/pulse jet/‘combined cycle engines’, including devices to regulate combustion, and specially designed components therefor, usable in the systems specified in 1.A. or 19.A.2.

Technical Note:

In Item 3.A.2., ‘combined cycle engines’ are the engines that employ two or more cycles of the following types of engines: gas-turbine engine (turbojet, turboprop, turbofan and turboshaft), ramjet, scramjet, pulse jet, pulse detonation engine, rocket motor (liquid/solidpropellant and hybrid).

3.A.3. Rocket motor cases, ‘insulation’ components and nozzles therefor, usable in the systems specified in 1.A. or 19.A.1.

Technical Note:

In 3.A.3. ‘insulation’ intended to be applied to the components of a rocket motor, i.e. the case, nozzle inlets, case closures, includes cured or semi-cured compounded rubber components comprising sheet stock containing an insulating or refractory material. It may also be incorporated as stress relief boots or flaps.

Note:

Refer to 3.C.2. for ‘insulation’ material in bulk or sheet form.

3.A.4. 可用於1.A.所述系統中的火箭各節接合機制、分離機制及節間裝置。

3.A.5. 經設計或改進能在20至2000赫茲之間和加速度大於10個標準重力加速度的振動環境中工作的液體和懸浮推進劑（包含氧化劑）控制系統，以及可用於1.A.所述系統、為此專門設計的部件。

註：

1. 包含在上述3.A.5.內之伺服閥及泵，僅有：

a. 絕壓等於或大於7000千帕（1000psi）、時流量等於或大於24升/分和作動器響應時間小於100微秒的伺服閥。

b. 用於液體推進劑的、轉速等於或大於8000轉/分，並且出口壓力等於或大於7000千帕（1000psi）的泵。

2. 3.A.5.中所述系統及組件可作為衛星部件出口。

3.A.6. 可用於1.A.、19.A.1.、19.A.2.所述系統的複合火箭發動機及為其專門設計的組件。

3.A.7. 具有國際標準化組織492容限級2（或ANSI/ABMA標準20容限級ABEC-9或其他國家同等標準）所述所有容限或更高並具備下列所有特徵的星形滾珠軸承：

a. 內環內徑在12至50毫米之間；

b. 外環外徑在25至100毫米之間；以及

c. 寬度在10至20毫米之間。

3.A.8. 經專門設計用來裝第4.C.項所列推進劑或第1.A.1.項所述系統用的其他液體推進劑的液體推進劑箱。

3.A.9. 專門為1.A.2.或19.A.2.所述系統設計的“渦輪螺旋槳飛機發動機系統”，以及專門為此設計的組件，該系統的最大動力超過10kW（未安裝時海平面標準情況下的測試結果），民用認證發動機除外。

技術註釋：

在第3.A.9.項中，“渦輪螺旋槳飛機發動機系統”包括以下所有組件：

a. 渦輪軸發動機；以及

b. 為螺旋槳輸送動力的動力傳輸系統。

3.B. 測試及生產設備

3.B.1. 為3.A.1.、3.A.2.、3.A.3.、3.A.4.、3.A.5.、3.A.6.、3.A.8.、3.A.9.或3.C.中所述設備或材料而專門設計的“生產設施”。

3.A.4. Staging mechanisms, separation mechanisms, and inter-stages therefor, usable in the systems specified in 1.A.

3.A.5. Liquid and slurry propellant (including oxidisers) control systems, and specially designed components therefor, usable in the systems specified in 1.A., designed or modified to operate in vibration environments greater than 10 g rms between 20 Hz and 2 kHz.

Notes:

1. The only servo valves and pumps specified in 3.A.5. are the following:

a. Servo valves designed for flow rates equal to or greater than 24 litres per minute, at an absolute pressure equal to or greater than 7 MPa, that have an actuator response time of less than 100 ms.

b. Pumps, for liquid propellants, with shaft speeds equal to or greater than 8,000 rpm or with discharge pressures equal to or greater than 7 MPa.

2. Systems and components specified in 3.A.5. may be exported as part of a satellite.

3.A.6. Specially designed components for hybrid rocket motors specified in 2.A.1.c. and 20.A.1.b.

3.A.7. Radial ball bearings having all tolerances specified in accordance with ISO 492 Tolerance Class 2 (or ANSI/ABMA Std 20 Tolerance Class ABEC-9 or other national equivalents), or better and having all the following characteristics:

a. An inner ring bore diameter between 12 and 50 mm;

b. An outer ring outside diameter between 25 and 100 mm; and

c. A width between 10 and 20 mm.

3.A.8. Liquid propellant tanks specially designed for the propellants controlled in Item 4.C. or other liquid propellants used in the systems specified in 1.A.1.

3.A.9. ‘Turboprop engine systems’ specially designed for the systems in 1.A.2. or 19.A.2., and specially designed components therefor, having a maximum power greater than 10 kW (achieved uninstalled at sea level standard conditions), excluding civil certified engines.

Technical Note:

For the purposes of Item 3.A.9., a ‘turboprop engine system’ incorporates all of the following:

a. Turboprop engine; and

b. Power transmission system to transfer the power to a propeller.

3.B. TEST AND PRODUCTION EQUIPMENT

3.B.1. “Production facilities” specially designed for equipment or materials specified in 3.A.1., 3.A.2., 3.A.3., 3.A.4., 3.A.5., 3.A.6., 3.A.8., 3.A.9. or 3.C.

3.B.2. 為3.A.1.、3.A.2.、3.A.3.、3.A.4.、3.A.5.、3.A.6.、3.A.8.、3.A.9.或3.C.中所述設備或材料而專門設計的“生產設備”。

3.B.3. 具有下列特徵的滾壓成型機床及為其專門設計的組件：

a. 即使在運送時並未裝置數值控制單元，也可依照製造商技術規範，裝置數值控制單元或計算機控制器；以及

b. 有雙軸以上可同時協調外形控制。

註：

本項不包括可用於1.A.所述系統的推進組件及設備（如發動機殼體）“生產”使用的機械。

技術註釋：

為本項的目的，兼具滾壓成型及旋壓成型功能的機床列為滾壓成型機床。

3.C. 材料

3.C.1. 可用於1.A.所述系統、或為19.A.1.或19.A.2.所述系統專門設計的火箭發動機殼體“內襯”。

技術註釋：

在3.C.1.中，適用於固態推進劑與殼體或絕緣層之界面黏合的內襯，通常是一種以耐火或絕熱材料為基底的液態聚合物。例如：加碳的HTPB或其他添加硬化劑的聚合物，被噴灑或塗布在殼體的內部。

3.C.2. 可用於1.A.所述系統、或為19.A.1.或19.A.2.所述系統專門設計的火箭發動機殼體的塊狀“絕熱”材料。

技術註釋：

在3.C.2.中，用於火箭發動機組件，如：殼體、噴嘴進氣道、外殼封蓋的“絕熱層”，包括內含絕熱或耐火物質之片狀樞托組成的熟化或半熟化之複合橡膠組件。此絕熱層亦可並用於消除應力襯邊或襟翼中。

3.D. 軟件

3.D.1. 為3.B.1.或3.B.3.中所述“生產設施”及滾壓成型機床的“使用”而專門設計或改進的“軟件”。

3.D.2. 為3.A.1.、3.A.2.、3.A.3.、3.A.4.、3.A.5.、3.A.6.或3.A.9.中所述設備的“使用”而專門設計或改進的“軟件”。

註：

1. 為3.A.1.所述發動機的“使用”而專門設計的“軟件”可作為有人駕駛飛機部件或作為更替“軟件”出口。

3.B.2. “Production equipment” specially designed for equipment or materials specified in 3.A.1., 3.A.2., 3.A.3., 3.A.4., 3.A.5., 3.A.6., 3.A.8., 3.A.9. or 3.C.

3.B.3. Flow-forming machines, and specially designed components therefor, which:

a. According to the manufacturers technical specification can be equipped with numerical control units or a computer control, even when not equipped with such units at delivery; and

b. Have more than two axes which can be co-ordinated simultaneously for contouring control.

Note:

This item does not include machines that are not usable in the “production” of propulsion components and equipment (e.g. motor cases) for systems specified in 1.A.

Technical Note:

Machines combining the function of spin-forming and flow-forming are, for the purpose of this item, regarded as flow-forming machines.

3.C. MATERIALS

3.C.1. ‘Interior lining’ usable for rocket motor cases in the systems specified in 1.A. or specially designed for systems specified in 19.A.1. or 19.A.2.

Technical Note:

In 3.C.1. ‘interior lining’ suited for the bond interface between the solid propellant and the case or insulating liner is usually a liquid polymer based dispersion of refractory or insulating materials e.g. carbon filled HTPB or other polymer with added curing agents to be sprayed or screeded over a case interior.

3.C.2. ‘Insulation’ material in bulk form usable for rocket motor cases in the systems specified in 1.A. or specially designed for systems specified in 19.A.1. or 19.A.2.

Technical Note:

In 3.C.2. ‘insulation’ intended to be applied to the components of a rocket motor, i.e. the case, nozzle inlets, case closures, includes cured or semi-cured compounded rubber sheet stock containing an insulating or refractory material. It may also be incorporated as stress relief boots or flaps specified in 3.A.3.

3.D. SOFTWARE

3.D.1. “Software” specially designed or modified for the “use” of “production facilities” and flow forming machines specified in 3.B.1. or 3.B.3.

3.D.2. “Software” specially designed or modified for the “use” of equipment specified in 3.A.1., 3.A.2., 3.A.4., 3.A.5., 3.A.6. or 3.A.9.

Notes:

1. “Software” specially designed or modified for the “use” of engines specified in 3.A.1. may be exported as part of a manned aircraft or as replacement “software” therefor.

2. 為3.A.5.所述推進劑控制系統的“使用”而專門設計的“軟件”，可作為作衛星部件或作為更替“軟件”出口。

3.D.3. 為3.A.2.、3.A.3.或3.A.4.中所述設備的“研製”而專門設計或改進的“軟件”。

3.E. 技術

3.E.1. 依照“一般技術注意事項”，指3.A.1.、3.A.2.、3.A.3.、3.A.4.、3.A.5.、3.A.6.、3.A.9.、3.B.、3.C.和3.D.中所述設備、材料或“軟件”的“研製”、“生產”或“使用”的“技術”。

第二類；第 4 項

第4項 推進劑、化學品及推進劑生產

4.A. 設備、裝配及組件

無。

4.B. 測試及生產設備

4.B.1. 為4.C.中所述液體推進劑或推進劑成分的“生產”、處理或驗收測試之“生產設備”及為其專門設計的組件。

4.B.2. 為不屬4.B.3.中描述的“生產設備”，以及為4.C.中所述固體推進劑或推進劑成分的生產、貯運、混合、固化、鑄造、壓制、加工、拉擠或驗收測試而專門設計的組件。

4.B.3. 以下設備及為其專門設計的組件：

a. 間歇式攪拌機，可在0至13.326千帕真空及攪拌室具溫控能力條件下操作，並具下列所有特點：

1. 混拌容量110公升以上；且
2. 至少有一個離心混合/捏拌軸；

b. 連續式攪拌機，可在0-13.326千帕真空及攪拌室具溫控能力條件下操作，並具下列一個特點：

1. 有兩個以上混合/捏拌軸；或
2. 單一振盪旋轉軸，在軸上以及在攪拌室內殼都有攪拌齒/攪拌針；

c. 可用來研磨4.C.所述物質的流體能研磨機；

d. 可用來在控制環境下，“生產”4.C.2.c.、4.C.2.d.或4.C.2.e.中所述球狀或霧狀材料的金屬粉體“生產設備”。

2. “Software” specially designed or modified for the “use” of propellant control systems specified in 3.A.5. may be exported as part of a satellite or as replacement “software” therefor.

3.D.3. “Software” specially designed or modified for the “development” of equipment specified in 3.A.2., 3.A.3. or 3.A.4.

3.E. TECHNOLOGY

3.E.1. “Technology”, in accordance with the General Technology Note, for the “development”, “production” or “use” of equipment, materials or “software” specified in 3.A.1., 3.A.2., 3.A.3., 3.A.4., 3.A.5., 3.A.6., 3.A.8., 3.A.9., 3.B., 3.C. or 3.D.

Category II; Item 4

ITEM 4 PROPELLANTS, CHEMICALS AND PROPELLANT PRODUCTION

4.A. EQUIPMENT, ASSEMBLIES AND COMPONENTS

None.

4.B. TEST AND PRODUCTION EQUIPMENT

4.B.1. “Production equipment”, and specially designed components therefor, for the “production”, handling or acceptance testing of liquid propellants or propellant constituents specified in 4.C.

4.B.2. “Production equipment”, other than that described in 4.B.3., and specially designed components therefor, for the production, handling, mixing, curing, casting, pressing, machining, extruding or acceptance testing of solid propellants or propellant constituents specified in 4.C.

4.B.3. Equipment as follows, and specially designed components therefor:

a. Batch mixers with provision for mixing under vacuum in the range of zero to 13.326 kPa and with temperature control capability of the mixing chamber and having all of the following:

1. A total volumetric capacity of 110 litres or more; and
2. At least one mixing/kneading shaft mounted off centre;

b. Continuous mixers with provision for mixing under vacuum in the range of zero to 13.326 kPa and with a temperature control capability of the mixing chamber having any of the following:

1. Two or more mixing/kneading shafts; or
2. A single rotating shaft which oscillates and having kneading teeth/pins on the shaft as well as inside the casing of the mixing chamber;

c. Fluid energy mills usable for grinding or milling substances specified in 4.C.;

d. Metal powder “production equipment” usable for the “production”, in a controlled environment, of spherical or atomised materials specified in 4.C.2.c., 4.C.2.d. or 4.C.2.e.

註：

4.B.3.d.包括：

a. 可在氬-水環境下設定流程，用來獲得濺爆或球形金屬粉體之高頻電弧噴射電漿發生器；

b. 可在氬-水環境下設定流程，用來獲得濺爆或球形金屬粉體之電子爆炸設備；

c. 可用在鈍氣媒介（如氮氣）中將熔體做成球狀鋁粉的設備。

註：

1. 4.B.3.涵括可用來生產4.C.所述固體推進劑或其成分間歇式攪拌機及連續式攪拌機，以及4.B.所述流體能研磨機。

2. 4.B.3.d.未述金屬粉體“生產設備”類型將依據4.B.2.規範評估。

4.C. 材料

4.C.1. 複合及改良複合雙基推進劑。

4.C.2. 燃料物質如下：

a. 純度高於70%的肼（CAS 302-01-2）；

b. 肼衍生物如下：

1. 單甲基肼（MMH）（CAS 60-34-4）；

2. 不對稱二甲基肼（UDMH）（CAS 57-14-7）；

3. 單硝酸肼；

4. 三甲基肼（CAS 1741-01-1）；

5. 四甲基肼（CAS 6415-12-9）；

6. NN二烯丙基肼；

7. 烯丙基肼（CAS 7422-78-8）；

8. 乙烯二肼；

9. 單肼二硝酸酯；

10. 偏二甲基肼硝酸鹽；

11. 硝仿肼疊氮化物（CAS 14546-44-2）；

12. 二甲基硝仿肼疊氮化物；

13. 硝仿肼二硝酸酯；

14. 二亞氨基草酸二肼（CAS 3457-37-2）；

Note:

4.B.3.d. includes:

a. Plasma generators (high frequency arc-jet) usable for obtaining sputtered or spherical metallic powders with organization of the process in an argon-water environment;

b. Electrobust equipment usable for obtaining sputtered or spherical metallic powders with organization of the process in an argon-water environment;

c. Equipment usable for the “production” of spherical aluminium powders by powdering a melt in an inert medium (e.g. nitrogen).

Notes:

1. The only batch mixers, continuous mixers, usable for solid propellants or propellants constituents specified in 4.C., and fluid energy mills specified in 4.B., are those specified in 4.B.3.

2. Forms of metal powder “production equipment” not specified in 4.B.3.d. are to be evaluated in accordance with 4.B.2.

4.C. MATERIALS

4.C.1. Composite and composite modified double base propellants.

4.C.2. Fuel substances as follows:

a. Hydrazine (CAS 302-01-2) with a concentration of more than 70%;

b. Hydrazine derivatives as follows:

1. Monomethylhydrazine (MMH) (CAS 60-34-4);

2. Unsymmetrical dimethylhydrazine (UDMH) (CAS 57-14-7);

3. Hydrazine mononitrate;

4. Trimethylhydrazine (CAS 1741-01-1);

5. Tetramethylhydrazine (CAS 6415-12-9);

6. N,N diallylhydrazine;

7. Allylhydrazine (CAS 7422-78-8);

8. Ethylene dihydrazine;

9. Monomethylhydrazine dinitrate;

10. Unsymmetrical dimethylhydrazine nitrate;

11. Hydrazinium azide (CAS 14546-44-2);

12. Dimethylhydrazinium azide;

13. Hydrazinium dinitrate;

14. Diimido oxalic acid dihydrazine (CAS 3457-37-2);

15. 2-羥基乙肼硝酸 (HEHN) ;

16. 硝仿肼氨酸鹽 (CAS 27978-54-7) ;

17. 硝仿肼二氯酸鹽 (CAS 13812-39-0) ;

18. 甲肼硝酸 (MHN) ;

19. 二乙肼硝酸 (DEHN) ;

20. 3,6-二肼基四氮雜苯硝酸 (DHTN) ;

技術註釋 :

3,6-二肼基四氮雜苯硝酸也被稱為二肼硝酸。

c. 依ISO 2591 : 1988或同等之國家標準 (如JIS Z8820) , 大小均勻之球狀鋁粉 (CAS 7429-90-5) , 其粒徑小於200微米, 純度為97% (以重量計算) 以上, 且所含至少10%的粒徑小於63微米;

技術註釋 :

粒徑為63微米 (ISO R-565) 的粉體相當於Tyler 250篩孔等級或ASTM standard E-11規定的230篩孔等級。

d. 粒徑小於 60×10^{-6} 米 (60微米) 且純度為97% (以重量計算) 或以上之銻 (CAS 7440-67-7) 、鈹 (CAS 7440-41-7) 、鎂 (CAS 7439-95-4) 及這些元素合金的粉體, 可以是球狀的、霧狀的、似球體的、片狀的或研磨而成的;

技術註釋 :

銻金屬內之自然鈹 (CAS 7440-58-6) 含量 (通常為2-7%) 與銻一起計算。

e. 粒徑小於 60×10^{-6} 米 (60 μ m) 且純度為85% (以重量計算) 或以上之硼 (CAS 7440-42-8) 及硼合金的粉體, 可以是球狀的、霧狀的、似球體的、片狀的或研磨而成的;

f. 1.A.或19.A.所述系統可以使用的以下高能量密度物質:

1. 由固體和液體燃料組成的混合燃料, 如能量密度為 40×10^6 焦耳/公斤或以上的硼漿之高能量密度物質;

2. 在20°C和一種大氣壓 (101.325kPa) 下測量容量密度在 37.5×10^9 焦耳/米³或以上的其他高能量密度燃料和燃料添加劑 (如立方烷、離子溶劑JP-10) 。

註 :

4.C.2.f.2.不管制從化石中提煉的燃料以及從蔬菜中提煉的生物燃料, 包括經認證可用於民航的發動機燃油, 除非專門為1.A.或19.A.所述系統配製。

15. 2-hydroxyethylhydrazine nitrate (HEHN);

16. Hydrazinium perchlorate (CAS 27978-54-7);

17. Hydrazinium diperchlorate (CAS 13812-39-0);

18. Methylhydrazine nitrate (MHN);

19. Diethylhydrazine nitrate (DEHN);

20. 3,6-dihydrazino tetrazine nitrate (DHTN);

Technical note:

3,6-dihydrazino tetrazine nitrate is also referred to as 1,4-dihydrazine nitrate

c. Spherical aluminium powder (CAS 7429-90-5) with particles of uniform diameter of less than 200×10^{-6} m (200 μ m) and an aluminium content of 97% by weight or more, if at least 10% of the total weight is made up of particles of less than 63 μ m, according to ISO 2591:1988 or national equivalents such as JIS Z8820;

Technical Note:

A particle size of 63 μ m (ISO R-565) corresponds to 250 mesh (Tyler) or 230 mesh (ASTM standard E-11).

d. Zirconium (CAS 7440-67-7), beryllium (CAS 7440-41-7), magnesium (CAS 7439-95-4) and alloys of these in particle size less than 60×10^{-6} m (60 μ m), whether spherical, atomised, spheroidal, flaked or ground, consisting of 97% by weight or more of any of the above mentioned metals;

Technical Note:

The natural content of hafnium (CAS 7440-58-6) in the zirconium (typically 2% to 7%) is counted with the zirconium.

e. Boron (CAS 7440-42-8) and boron alloys in particle size less than 60×10^{-6} m (60 μ m), whether spherical, atomised, spheroidal, flaked or ground with a purity of 85% by weight or more;

f. High energy density materials, usable in the systems specified in 1.A. or 19.A., as follows:

1. Mixed fuels that incorporate both solid and liquid fuels, such as boron slurry, having a mass-based energy density of 40×10^6 J/kg or greater;

2. Other high energy density fuels and fuel additives (e.g., cubane, ionic solutions, JP-10) having a volume-based energy density of 37.5×10^9 J/m³ or greater, measured at 20 °C and one atmosphere (101.325 kPa) pressure.

Note:

Item 4.C.2.f.2. does not control fossil refined fuels and biofuels produced from vegetables, including fuels for engines certified for use in civil aviation, unless specifically formulated for systems specified in 1.A. or 19.A.

4.C.3. 氧化劑/燃料如下：

與粉狀金屬或其他高能燃料組成分混合之過氯酸鹽、氯酸鹽或鉻酸鹽。

4.C.4. 氧化劑物質：

a. 可用於液體推進劑火箭發動機的氧化劑物質如下：

1. 三氧化二氮（CAS 10544-73-7）；
2. 二氧化氮（CAS 10102-44-0）/四氧化二氮（CAS 10544-72-6）；
3. 五氧化二氮（CAS 10102-03-1）；
4. 混合氧化氮化合物（MON）；
5. 抑型紅色發煙硝酸（IRFNA）（CAS 8007-58-7）；
6. 由氟與一個或一個以上之其他鹵素元素、氧或氮所組成的化合物；

註：

4.C.a.6. 不管制氣體狀態的三氟化氮（NF₃），因為這種物質不能用於導彈。

技術註釋：

混合氧化氮化合物（MON）為氧化氮（NO）在四氧化二氮/二氧化氮的溶液，可用在導彈系統。其組成範圍可以MON_i或MON_{ij}來表示，其中i和j為整數，代表氧化氮在該混合物中的百分比（如MON₃中含3%的氧化氮，MON₂₅則含25%氧化氮，通常上限為MON₄₀）。

b. 可用於固體推進劑火箭發動機的氧化劑物質如下：

1. 過氯酸銨（AP）（CAS 7790-98-9）；
2. 二硝醯胺銨（AND）（CAS 140456-78-6）；
3. 硝基胺類[環四甲基四硝胺（HMX）]（CAS 2691-41-0）、環三甲基三硝胺（RDX）（CAS 121-82-4）；
4. 硝仿肼（HNF）（CAS 20773-28-8）；
5. 2,4,6,8,10,12-Hexanitrohexaazaisowurtzitane（CL-20）（CAS 135285-90-4）。

4.C.5. 聚合物如下：

- a. 羧基端聚丁二烯（Carboxy-terminated polybutadiene）（包括carboxyl-terminated polybutadiene）（CTPB）；
- b. 羥基端聚丁二烯（Hydroxy-terminated polybutadiene）（包括hydroxyl-terminated polybutadiene）（HTPB）；

4.C.3. Oxidisers/Fuels as follows:

Perchlorates, chlorates or chromates mixed with powdered metals or other high energy fuel components.

4.C.4. Oxidiser substances as follows:

a. Oxidiser substances usable in liquid propellant rocket engines as follows:

1. Dinitrogen trioxide (CAS 10544-73-7);
2. Nitrogen dioxide (CAS 10102-44-0) / dinitrogen tetroxide (CAS 10544-72-6);
3. Dinitrogen pentoxide (CAS 10102-03-1);
4. Mixed Oxides of Nitrogen (MON);
5. Inhibited Red Fuming Nitric Acid (IRFNA) (CAS 8007-58-7);
6. Compounds composed of fluorine and one or more of other halogens, oxygen or nitrogen;

Note:

Item 4.C.4.a.6. does not control Nitrogen Trifluoride (NF₃) (CAS 7783-54-2) in a gaseous state as it is not usable for missile applications.

Technical Note:

Mixed Oxides of Nitrogen (MON) are solutions of Nitric Oxide (NO) in Dinitrogen Tetroxide/Nitrogen Dioxide (N₂O₄/NO₂) that can be used in missile systems. There are a range of compositions that can be denoted as MON_i or MON_{ij} where i and j are integers representing the percentage of Nitric Oxide in the mixture (e.g. MON₃ contains 3% Nitric Oxide, MON₂₅ 25% Nitric Oxide. An upper limit is MON₄₀, 40% by weight).

b. Oxidiser substances usable in solid propellant rocket motors as follows:

1. Ammonium perchlorate (AP) (CAS 7790-98-9);
2. Ammonium dinitramide (ADN) (CAS 140456-78-6);
3. Nitro-amines (cyclotetramethylene — tetranitramine (HMX) (CAS 2691-41-0); cyclotrimethylene — trinitramine (RDX) (CAS 121-82-4);
4. Hydrazinium nitroformate (HNF) (CAS 20773-28-8);
5. 2,4,6,8,10,12 — Hexanitrohexaazaisowurtzitane (CL-20) (CAS 135285-90-4).

4.C.5. Polymeric substances, as follows:

- a. Carboxy — terminated polybutadiene (including carboxyl — terminated polybutadiene) (CTPB);
- b. Hydroxy — terminated polybutadiene (including hydroxyl — terminated polybutadiene) (HTPB);

- c. 丙烯酸根疊氮聚合物 (GAP) ;
- d. 聚丁二烯-丙烯酸 (PBAA) ;
- e. 聚丁二烯-丙烯酸-丙烯腈三聚物 (PBAN) ;
- f. 聚四氫呋喃聚乙烷甘醇 (TPEG) 。

技術註釋：

聚四氫呋喃聚乙烷甘醇 (TPEG) 聚1,4-丁二醇和聚乙烷甘醇 (PEG) 的塊狀共聚物。

4.C.6. 其他推進劑添加物與藥劑 (agents) 如下：

a. 結合劑 (Bonding agents) 如下：

1. 三[1-(2-甲基)氮丙啶基]氧化磷 (MAPO) (CAS 57-39-6) ;

2. 1,1',1'' -對稱苯三甲醯-1-(2-乙基)氮丙啶 (HX-868,BITA) (CAS 7722-73-8) ;

3. Tepanol (HX-878) , 此為四次乙化五胺、丙烯腈及 2,3-環氧丙醇 (縮水甘油) (CAS 68412-46-4) ; 之反應生成物；

4. Tepan (HX-879) , 此為四乙炔戊胺與丙烯腈之反應生成物丙烯腈 (CAS 68412-45-3) ;

5. 以異苯二甲酸、對稱苯三甲酸、異三聚氰酸、或三甲基己二酸等酸根為主幹組成多功能基氮丙啶醯胺化合物，亦含有 2-甲基或2-乙基之氮丙啶功能基；

註：

第4.C.6.a.5.項包括：

1. 1,1'-間苯二醯-雙(2-甲氮丙啶) (HX-752) (CAS 7652-64-4) ;

2. 2,4,6-三(2-乙-1-吡丙啶基)-1,3,5-三嗪 (HX-874) (CAS 18924-91-9) ;

3. 1,1'-三乙己二醯雙(2-乙氮丙啶) (HX-877) (CAS 71463-62-2) 。

b. 固化反應催化劑如下：

三苯基鉍 (TPB) (CAS 603-33-8) ;

c. 燃速改性劑如下：

1. 碳硼烷、癸硼烷、戊硼烷及其衍生物；

2. 二茂鐵衍生物如下：

a. Catocene (CAS 37206-42-1) ;

c. Glycidyl azide polymer (GAP);

d. Polybutadiene — Acrylic Acid (PBAA);

e. Polybutadiene — Acrylic Acid — Acrylonitrile (PBAN);

f. Polytetrahydrofuran polyethylene glycol (TPEG).

Technical Note:

Polytetrahydrofuran polyethylene glycol (TPEG) is a block co-polymer of poly 1,4 — Butanediol and polyethylene glycol (PEG).

4.C.6. Other propellant additives and agents as follows:

a. Bonding agents as follows:

1. Tris (1-(2-methyl)aziridinyl) phosphine oxide (MAPO) (CAS 57-39-6);

2. 1,1',1'' — trimesoyl-tris (2-ethylaziridine) (HX-868, BITA) (CAS 7722-73-8);

3. Tepanol (HX-878), reaction product of tetraethylenepentamine, acrylonitrile and glycidol (CAS 68412-46-4);

4. Tepan (HX-879), reaction product of tetraethylenepentamine and acrylonitrile (CAS 68412-45-3);

5. Polyfunctional aziridine amides with isophthalic, trimesic, isocyanuric, or trimethyladipic backbone also having a 2-methyl or 2-ethyl aziridine group;

Note:

Item 4.C.6.a.5. includes:

1. 1,1' — Isophthaloyl-bis(2-methylaziridine) (HX-752) (CAS 7652-64-4);

2. 2,4,6 — tris(2-ethyl-1-aziridinyl)-1,3,5-triazine (HX-874) (CAS 18924-91-9);

3. 1,1' — trimethyladipoylbis(2-ethylaziridine) (HX-877) (CAS 71463-62-2).

b. Curing reaction catalysts as follows:

Triphenyl bismuth (TPB) (CAS 603-33-8);

c. Burning rate modifiers, as follows:

1. Carboranes, decaboranes, pentaboranes and derivatives thereof;

2. Ferrocene derivatives, as follows:

a. Catocene (CAS 37206-42-1);

- b. Ethyl ferrocene (CAS 1273-89-8) ;
- c. Propyl ferrocene ;
- d. n-Butyl ferrocene (CAS 31904-29-7) ;
- e. Pentyl ferrocene (CAS 1274-00-6) ;
- f. Dicyclopentyl ferrocene ;
- g. Dicyclohexyl ferrocene ;
- h. Diethyl ferrocene (CAS 1273-97-8) ;
- i. Dipropyl ferrocene ;
- j. Dibutyl ferrocene (CAS 1274-08-4) ;
- k. Dihexyl ferrocene ;
- l. Acetyl ferrocenes ;
- m. ferrocene Carboxylic acids ;
- n. Butacene (CAS 125856-62-4) ;
- o. 可用作火箭推進劑燃速改性劑的其他二茂鐵衍生物 ;

註 :

4.C.6.C.2.0.不管制含有二茂鐵分子附屬六碳芳香官能團的二茂鐵衍生物。

d. 酯與塑化劑如下 :

- 1. 三甘醇二硝酸酯 (TEGDN) (CAS 111-22-8) ;
- 2. 三甲醇基乙烷三硝酸酯 (TMETN) (CAS 3032-55-1) ;
- 3. 1,2,4丁三醇三硝酸酯 (BTTN) (CAS 6659-60-5) ;
- 4. 二甘醇二硝酸酯 (DEGDN) (CAS 693-21-0) ;
- 5. 4,5二疊氮基甲基-2-甲-1,2,3-三唑 (iso-DAMTR) ;

6. 硝酸基乙硝酸 (NENA) 基增塑劑如下 :

- a. 甲基尼納 (CAS 17096-47-8) ;
- b. 乙基尼納 (CAS 85068-73-1) ;
- c. 丁基尼納 (CAS 82486-82-6) ;

7. 硝基如下 :

- a. 2,2-二硝基丙醇縮甲醛 (BDNPA) (CAS 5108-69-0) ;
- b. 2,2-二硝基丙醇縮乙醛 (BDNPF) (CAS 5917-61-3) ;

e. 穩定劑如下 :

- 1. 2-硝基二苯胺 (CAS 119-75-5) ;

- b. Ethyl ferrocene (CAS 1273-89-8);
- c. Propyl ferrocene;
- d. n-Butyl ferrocene (CAS 31904-29-7);
- e. Pentyl ferrocene (CAS 1274-00-6);
- f. Dicyclopentyl ferrocene;
- g. Dicyclohexyl ferrocene;
- h. Diethyl ferrocene (CAS 1273-97-8);
- i. Dipropyl ferrocene;
- j. Dibutyl ferrocene (CAS 1274-08-4);
- k. Dihexyl ferrocene (CAS 93894-59-8);
- l. Acetyl ferrocene (CAS 1271-55-2) / 1,1' — diacetyl ferrocene (CAS 1273-94-5);
- m. Ferrocene carboxylic acid (CAS 1271-42-7) / 1,1' — Ferrocenedicarboxylic acid (CAS 1293-87-4);
- n. Butacene (CAS 125856-62-4);
- o. Other ferrocene derivatives usable as rocket propellant burning rate modifiers;

Note:

Item 4.C.6.c.2.o does not control ferrocene derivatives that contain a six carbon aromatic functional group attached to the ferrocene molecule.

d. Esters and plasticisers as follows:

- 1. Triethylene glycol dinitrate (TEGDN) (CAS 111-22-8);
- 2. Trimethylolethane trinitrate (TMETN) (CAS 3032-55-1);
- 3. 1,2,4-butanetriol trinitrate (BTTN) (CAS 6659-60-5);
- 4. Diethylene glycol dinitrate (DEGDN) (CAS 693-21-0);
- 5. 4,5 diazidomethyl-2-methyl-1,2,3-triazole (iso- DAMTR);

6. Nitrateethylnitramine (NENA) based plasticisers, as follows:

- a. Methyl-NENA (CAS 17096-47-8);
- b. Ethyl-NENA (CAS 85068-73-1);
- c. Butyl-NENA (CAS 82486-82-6);

7. Dinitropropyl based plasticisers, as follows:

- a. Bis (2,2-dinitropropyl) acetal (BDNPA) (CAS 5108-69-0);
- b. Bis (2,2-dinitropropyl) formal (BDNPF) (CAS 5917-61-3);

e. Stabilisers as follows:

- 1. 2-Nitrodiphenylamine (CAS 119-75-5);

2. N-甲基對硝基苯胺 (CAS 100-15-2)。

2. N-methyl-p-nitroaniline (CAS 100-15-2).

4.D. 軟件

4.D. SOFTWARE

4.D.1. 為“生產”及處理4.C.所述材料，“使用”在4.B.所述設備而專門設計或修改進的“軟件”。

4.D.1. “Software” specially designed or modified for the “use” of equipment specified in 4.B. for the “production” and handling of materials specified in 4.C.

4.E. 技術

4.E. TECHNOLOGY

4.E.1. 依據“一般技術註釋”，指4.B.及4.C.所述設備或材料的“研製”、“生產”或“使用”的“技術”。

4.E.1 “Technology”, in accordance with the General Technology Note, for the “development”, “production” or “use” of equipment or materials specified in 4.B. and 4.C.

第二類；第 5 項

Category II; Item 5

第二類；第 6 項

RESERVED FOR FUTURE USE

第6項 結構複合材料生產、熱解沉積與致密化以及結構材料

Category II; Item 6

6.A. 設備、配裝及組件

ITEM 6 PRODUCTION OF STRUCTURAL COMPOSITES, PYROLYTIC DEPOSITION AND DENSIFICATION, AND STRUCTURAL MATERIALS

6.A.1. 為1.A.、19.A.1.或19.A.2.所述系統及2.A.或20.A.所述次系統之使用而專門設計的複合材料、積層板及其製造。

6.A. EQUIPMENT, ASSEMBLIES AND COMPONENTS

6.A.2. 所有下列再飽和熱解（如碳碳）組件：

6.A.1. Composite structures, laminates, and manufactures thereof, specially designed for use in the systems specified in 1.A., 19.A.1. or 19.A.2. and the subsystems specified in 2.A. or 20.A.

a. 為火箭系統設計；及

6.A.2. Resaturated pyrolysed (i.e. carbon-carbon) components having all of the following:

b. 可用在1.A.或19.A.1.所述系統。

a. Designed for rocket systems; and

b. Usable in the systems specified in 1.A. or 19.A.1.

6.B. 測試及生產設備

6.B. TEST AND PRODUCTION EQUIPMENT

6.B.1. 以下為生產可用在1.A.、19.A.1.或19.A.2.，中所述系統的結構複合材料、纖維、預浸料或預成型物之設備，以及為其專門設計的組件與配件：

6.B.1. Equipment for the “production” of structural composites, fibres, prepregs or preforms, usable in the systems specified in 1.A., 19.A.1. or 19.A.2., as follows, and specially designed components, and accessories therefor:

a. 繞線機或纖維鋪放機：專為自纖維和絲狀材料中抽取紗束以製造複合材料結構件（composite structures）或積層板而設計之繞線機及協調式程序化控制，其紗束之定位、纏覆及纏繞動作可調整或程序設定以三軸或更多軸進行；

a. Filament winding machines or fibre placement machines, of which the motions for positioning, wrapping and winding fibres can be co-ordinated and programmed in three or more axes, designed to fabricate composite structures or laminates from fibrous or filamentary materials, and co-ordinating and programming controls;

b. 纏帶機：專為製造飛機複合材料機身與導彈結構件而設計之纏帶機，其線帶與薄片定位與排放之動作可以計算機程序控制在二軸或二軸以上協調進行；

b. Tape-laying machines of which the motions for positioning and laying tape and sheets can be co-ordinated and programmed in two or more axes, designed for the manufacture of composite airframes and missile structures;

c. 多方向、多維編織機：為製造複合材料結構件而設計之編織機，包括供纖維紡織、編織或編結用之接續器與供修改用之套件；

c. Multi-directional, multi-dimensional weaving machines or interlacing machines, including adapters and modification kits for weaving, interlacing or braiding fibres to manufacture composite structures;

註：

Note:

6.B.1.c.並不管制未特別為所述最終使用而修改之紡織機器。

6.B.1.c. does not control textile machinery not modified for the end-uses stated.

d. 以下為生產下列纖維與絲線材料而設計或經改良之設備：

1. 用來轉換聚合纖維（如：聚丙烯、螺綫或聚碳矽烷）之設備，包括在加熱期間拉緊纖維之特殊設備；

2. 於加熱的細絲底材上，處以元素或化合物蒸汽沉澱之設備；

3. 將耐火陶瓷（如氧化鋁）濕式法抽絲（Wet-Spinning）之設備；

e. 為生產預浸料與預先成形物或特殊纖維之表面處理而設計或改良之設備，包括滾子、張力伸展器、塗敷設備、切割設備，以及掣子模子。

註：

6.B.1. 中所述機器的組件與附件為：用於複合材料結構件、積層板及相關產品預先成形壓縮、硬化、鑄造、燒結（Sintering）或黏結之模具、心軸、印模、夾具及翻模工具。

6.B.2. 為6.E.3.所指之制程而專門設計之噴嘴。

6.B.3. 具下列所有特性之均壓機（isostatic presses）：

a. 最大工作壓力等於或大於69兆帕；

b. 根據設計能達到並保持等於或高於600攝氏度的可控熱環境；且

c. 具有一內徑等於或大於254毫米的空腔。

6.B.4. 為碳碳複合材料增密而設計或改良的化學氣相沉積爐。

6.B.5. 為火箭噴嘴及再入飛行器鼻錐之結構複合材料增密及熱解，而設計或改良的設備和工藝程序控制裝置，但非屬6.B.3.或6.B.4.中所述的設備和裝置。

6.C. 材料

6.C.1. 用來製造6.A.1.中結構組件，不論是以有機基材或金屬基材製成，利用纖維或纖維絲之抗拉來增其強度，且其比抗拉強度大於 7.62×10^4 米，比模量大於 3.18×10^6 米之纖維樹脂含纖維預浸料及外敷纖維之金屬預成物。

註：

6.C.1.中所述纖維樹脂含纖維預浸料為使用固化後之玻璃轉變溫度（T_g）超過145攝氏度之樹脂，如ASTM D4065或其他相等國家規範中所制定。

d. Equipment designed or modified for the production of fibrous or filamentary materials as follows:

1. Equipment for converting polymeric fibres (such as polyacrylonitrile, rayon, or polycarbosilane) including special provision to strain the fibre during heating;

2. Equipment for the vapour deposition of elements or compounds on heated filament substrates;

3. Equipment for the wet-spinning of refractory ceramics (such as aluminium oxide);

e. Equipment designed or modified for special fibre surface treatment or for producing prepregs and preforms, including rollers, tension stretchers, coating equipment, cutting equipment and clicker dies.

Note:

Examples of components and accessories for the machines specified in 6.B.1. are moulds, mandrels, dies, fixtures and tooling for the preform pressing, curing, casting, sintering or bonding of composite structures, laminates and manufactures thereof.

6.B.2. Nozzles specially designed for the processes referred to in 6.E.3.

6.B.3. Isostatic presses having all of the following characteristics:

a. Maximum working pressure equal to or greater than 69 MPa;

b. Designed to achieve and maintain a controlled thermal environment of 600 °C or greater;

and

c. Possessing a chamber cavity with an inside diameter of 254 mm or greater.

6.B.4. Chemical vapour deposition furnaces designed or modified for the densification of carbon-carbon composites.

6.B.5. Equipment and process controls, other than those specified in 6.B.3. or 6.B.4., designed or modified for densification and pyrolysis of structural composite rocket nozzles and re-entry vehicle nose tips.

6.C. MATERIALS

6.C.1. Resin impregnated fibre prepregs and metal coated fibre preforms, for the goods specified in 6.A.1., made either with organic matrix or metal matrix utilising fibrous or filamentary reinforcements having a specific tensile strength greater than 7.62×10^4 m and a specific modulus greater than 3.18×10^6 m.

Note:

The only resin impregnated fibre prepregs specified in 6.C.1. are those using resins with a glass transition temperature (T_g), after cure, exceeding 145 °C as determined by ASTM D4065 or national equivalents.

技術註釋：

1. 在第6.C.1項中，“比抗拉強度”係指在溫度為 23 ± 2 攝氏度和相對濕度為 $50\pm 5\%$ 的條件下測量的極限抗拉強度（ N/m^2 ）除以比重（ N/m^3 ）；

2. 在第6.C.1項中，“比模量”係指在溫度為 $296\pm 2K$ （ 23 ± 2 攝氏度）和相對濕度為 $50\pm 5\%$ 的條件下測量的楊氏模量（ N/m^2 ）除以比重（ N/m^3 ）。

6.C.2. 滿足下列兩個條件的再飽和熱解（如碳碳）材料：

- a. 為火箭系統設計；及
- b. 可用在1.A.或19.A.1.所述系統。

6.C.3. 可用於火箭噴嘴和再入飛行器鼻錐之細粒再結晶塊狀石墨（在15攝氏度下量測，其密度至少為1.72克/立方厘米），其粒徑為100微米或更小者，並可製作下列物品：

- a. 直徑120毫米（含）以上，長度50毫米（含）以上的圓柱體；
- b. 內徑65毫米（含）以上，厚度25毫米（含）以上，長度50毫米（含）以上的配管；或
- c. 尺寸為120毫米×120毫米×50毫米或更大之方塊。

6.C.4. 可用於1.A.或19.A.1.所述系統中火箭噴嘴和再入飛行器鼻錐之熱解或纖維強化石墨。

6.C.5. 可用於1.A.或19.A.1.所述系統的導彈雷達天線罩的陶瓷複合材料（在100赫茲至10000赫茲的頻率下，介電常數小於6）。

6.C.6. 碳化矽材料如下：

- a. 可用於1.A.或19.A.1.所述系統中鼻錐之塊狀可加工碳化矽強化非燒結陶瓷；
- b. 可用於1.A.或19.A.1.所述系統中的鼻錐、再入飛行器、活動噴嘴的碳化矽強化陶瓷複合材料。

6.C.7. 可用在1.A.或19.A.1.所述系統中，用於製造導彈組件的材料：

- a. 鎢及其合金，重量純度不小於97%，為面積不超過 $50\times 10^{-6}m$ （50微米）的顆粒；
- b. 鉬及其合金，重量純度不小於97%，為面積不超過 $50\times 10^{-6}m$ （50微米）的顆粒；
- c. 含有以下各項的固體形態的鎢材料：

Technical Notes:

1. In Item 6.C.1. 'specific tensile strength' is the ultimate tensile strength in N/m^2 divided by the specific weight in N/m^3 , measured at a temperature of $(296 \pm 2)K$ ($(23 \pm 2)^\circ C$) and a relative humidity of $(50 \pm 5)\%$.

2. In Item 6.C.1. 'specific modulus' is the Young's modulus in N/m^2 divided by the specific weight in N/m^3 , measured at a temperature of $(296 \pm 2)K$ ($(23 \pm 2)^\circ C$) and a relative humidity of $(50 \pm 5)\%$.

6.C.2. Resaturated pyrolysed (i.e. carbon-carbon) materials having all of the following:

- a. Designed for rocket systems; and
- b. Usable in the systems specified in 1.A. or 19.A.1.

6.C.3. Fine grain graphites with a bulk density of at least 1.72 g/cc measured at 15 °C and having a grain size of $100 \times 10^{-6} m$ (100 μm) or less, usable for rocket nozzles and re-entry vehicle nose tips, which can be machined to any of the following products:

- a. Cylinders having a diameter of 120 mm or greater and a length of 50 mm or greater;
- b. Tubes having an inner diameter of 65 mm or greater and a wall thickness of 25 mm or greater and a length of 50 mm or greater; or
- c. Blocks having a size of 120 mm x 120 mm x 50 mm or greater.

6.C.4. Pyrolytic or fibrous reinforced graphites usable for rocket nozzles and re-entry vehicle nose tips usable in systems specified in 1.A. or 19.A.1.

6.C.5. Ceramic composite materials (dielectric constant less than 6 at any frequency from 100 MHz to 100 GHz) for use in missile radomes usable in systems specified in 1.A. or 19.A.1.

6.C.6. Silicon-carbide materials as follows:

- a. Bulk machinable silicon-carbide reinforced unfired ceramic usable for nose tips usable in systems specified in 1.A. or 19.A.1.;
- b. Reinforced silicon-carbide ceramic composites usable for nose tips, re-entry vehicles, nozzle flaps, usable in systems specified in 1.A. or 19.A.1.

6.C.7. Materials for the fabrication of missile components in the systems specified in 1.A., 19.A.1. or 19.A.2, as follows:

- a. Tungsten and alloys in particulate form with a tungsten content of 97% by weight or more and a particle size of $50 \times 10^{-6} m$ (50 μm) or less;
- b. Molybdenum and alloys in particulate form with a molybdenum content of 97% by weight or more and a particle size of $50 \times 10^{-6} m$ (50 μm) or less;
- c. Tungsten materials in the solid form having all of the following:

1. 以下任何物質組成：
 - (一) 鎢及其合金，鎢純度不小於97%；
 - (二) 鎢滲銅材料，鎢純度不小於80%；或
 - (三) 鎢滲銀材料，鎢純度不小於80%；以及
2. 可經機床加工成為下列任何產品：
 - (一) 直徑不小於120毫米、長度不小於50毫米的圓柱；
 - (二) 內徑不小於65毫米、內壁厚度不小於25毫米、長度不小於50毫米的圓管；
 - (三) 體積不小於120×120×50毫米的塊狀物。

6.C.8. 可用於1.A.或19.A.1.所述系統中的馬氏體時效鋼，具有所有以下特點：

- a. 20攝氏度時的極限抗拉強度大於或等於：
 1. 0.9GPa（在溶解退火階段）；
 2. 1.5GPa（在沉澱硬化階段）；
- b. 以下任何一種形式：
 1. 薄板型、金屬平板或管狀型，其壁厚或板厚等於或小於5.0毫米；
 2. 管狀型壁厚等於或大於50毫米且內徑等於或大於270毫米。

技術解釋：

馬氏體時效鋼是一種鐵合金：

- a. 通常具有高鎳含量、低碳含量，利用替代性元素或沉澱來實現合金的強化和時效硬化；
- b. 須經熱處理週期以便於馬氏體相變過程（溶解退火階段）及後面的時效硬化（沉澱硬化階段）

6.C.9. 滿足以下所有條件的可用在1.A.或19.A.1.所述系統中之加鈦安定雙重不鏽鋼（Ti-DSS）：

- a. 具備下列所有特性者：
 1. 含鉻及鎳之重量百分比分別為17.0-23.0%及4.5-7.0%；
 2. 含鈦之重量百分比為0.10%以上；且
 3. 氧化鐵-奧氏體微結構（亦稱兩相微結構），其中奧氏體所佔容積百分比至少10%（依ADTME-1181-87或同類之國家標準）；及

1. Any of the following material compositions:
 - i. Tungsten and alloys containing 97% by weight or more of tungsten;
 - ii. Copper infiltrated tungsten containing 80% by weight or more of tungsten; or
 - iii. Silver infiltrated tungsten containing 80% by weight or more of tungsten; and
2. Able to be machined to any of the following products:
 - i. Cylinders having a diameter of 120 mm or greater and a length of 50 mm or greater;
 - ii. Tubes having an inner diameter of 65 mm or greater and a wall thickness of 25 mm or greater and a length of 50 mm or greater; or
 - iii. Blocks having a size of 120 mm x 120 mm x 50 mm or greater.

6.C.8. Maraging steels, usable in the systems specified in 1.A. or 19.A.1., having all of the following:

- a. Having an ultimate tensile strength, measured at 20°C, equal to or greater than:
 1. 0.9 GPa in the solution annealed stage; or
 2. 1.5 GPa in the precipitation hardened stage; and
- b. Any of the following forms:
 1. Sheet, plate or tubing with a wall or plate thickness equal to or less than 5.0 mm; or
 2. Tubular forms with a wall thickness equal to or less than 50 mm and having an inner diameter equal to or greater than 270 mm.

Technical Note:

Maraging steels are iron alloys:

- a. *Generally characterised by high nickel, very low carbon content and use substitutional elements or precipitates to produce strengthening and age-hardening of the alloy; and*
- b. *Subjected to heat treatment cycles to facilitate the martensitic transformation process (solution annealed stage) and subsequently age hardened (precipitation hardened stage).*

6.C.9. Titanium-stabilized duplex stainless steel (Ti-DSS) usable in the systems specified in 1.A. or 19.A.1. and having all of the following:

- a. Having all of the following characteristics:
 1. Containing 17.0 - 23.0 weight percent chromium and 4.5 - 7.0 weight percent nickel;
 2. Having a titanium content of greater than 0.10 weight percent; and
 3. A ferritic-austenitic microstructure (also referred to as a two-phase microstructure) of which at least 10% is austenite by volume (according to ASTM E-1181-87 or national equivalents); and

b. 具有下列任何形狀：

1. 每一維的尺寸為100毫米或100毫米以上的錠材或棒材；
2. 寬度等於或大於600毫米和厚度等於或小於3毫米的薄板；或
3. 外徑等於或大於600毫米和壁厚等於或小於3毫米的管材。

6.D. 軟件

6.D.1. 為6.B.1.中所述設備的“使用”而專門設計或改進的“軟件”。

6.D.2. 為6.B.3.、6.B.4.或6.B.5.中所述設備專門設計或改進的“軟件”。

6.E. 技術

6.E.1. 依據“一般技術註釋”，指6.A.、6.B.、6.C.或6.D.所述設備、材料或“軟件”的“研製”、“生產”或“使用”的“技術”。

6.E.2. 可用在6.A.或6.C.所述設備或材料，對生產複合材料或部分加工之複合材料的壓力釜或水力高壓釜內溫度、壓力或大氣壓調節的“技術資料”（包括工藝過程條件）及步驟。

6.E.3. 在注模、芯模或其他基料上用母質氣體在1300攝氏度到2900攝氏度高溫範圍內和130帕（1mmHg）到20千帕（150mmHg）的壓力下分解而產生出熱解衍生材料的生產“技術”，包括母質氣體的合成，流量、工藝過程控制的規程以及參數控制的技術在內。

第二類；第 7 項

第二類；第 8 項

第二類；第 9 項

第9項 儀錶、導航及指向

9.A. 設備、配裝及組件

9.A.1. 為用於1.A.或19.A.1.或19.A.2.所述系統而設計或改良的整合式飛航儀錶系統，以及為其專門設計的組件。

9.A.2. 藉由自動追蹤天體或衛星來設定位置或方位的天文陀螺羅盤和其他裝置，以及為其專門設計的組件。

b. Any of the following forms:

1. Ingots or bars having a size of 100 mm or more in each dimension;
2. Sheets having a width of 600 mm or more and a thickness of 3 mm or less; or
3. Tubes having an outer diameter of 600 mm or more and a wall thickness of 3 mm or less.

6.D. SOFTWARE

6.D.1. “Software” specially designed or modified for the “use” of equipment specified in 6.B.1.

6.D.2. “Software” specially designed or modified for the equipment specified in 6.B.3., 6.B.4. or 6.B.5.

6.E. TECHNOLOGY

6.E.1. “Technology”, in accordance with the General Technology Note, for the “development”, “production” or “use” of equipment, materials or “software” specified in 6.A., 6.B., 6.C. or 6.D.

6.E.2. “Technical data” (including processing conditions) and procedures for the regulation of temperature, pressures or atmosphere in autoclaves or hydroclaves when used for the production of composites or partially processed composites, usable for equipment or materials specified in 6.A. or 6.C.

6.E.3. “Technology” for producing pyrolytically derived materials formed on a mould, mandrel or other substrate from precursor gases which decompose in the 1,300°C to 2,900°C temperature range at pressures of 130 Pa (1 mm Hg) to 20 kPa (150 mm Hg) including “technology” for the composition of precursor gases, flow-rates, and process control schedules and parameters.

Category II; Item 7

RESERVED FOR FUTURE USE

Category II; Item 8

RESERVED FOR FUTURE USE

Category II; Item 9

ITEM 9 INSTRUMENTATION, NAVIGATION AND DIRECTION FINDING

9.A. EQUIPMENT, ASSEMBLIES AND COMPONENTS

9.A.1. Integrated flight instrument systems which include gyro-stabilisers or automatic pilots, designed or modified for use in the systems specified in 1.A., or 19.A.1. or 19.A.2. and specially designed components therefor.

9.A.2. Gyro-astro compasses and other devices which derive position or orientation by means of automatically tracking celestial bodies or satellites, and specially designed components therefor.

9.A.3. 為可用於1.A.、19.A.1.、或19.A.2.所述系統的慣性制導系統或所有類型的制導系統而設計、具備下列兩個特性的直線加速度表及為其專門設計的組件：

- a. “標度因子” “重複性” 小於1250ppm；且
- b. “偏差” “重複性” 小於1250micro g。

註：

專門設計並研製作為使用於地井作業之“鑽井同時量測”(MWB) 感測器，不在9.A.3.管制範圍內。

技術註釋：

1. “偏差” 指沒有加速時加速度表上的讀數。
2. “標度因子” 指輸出的變化對輸入的變化的比率。
3. “偏差” 與 “標度因子” 的量度指一年時間相對於固定校準值的1 sigma 標準偏差度。

4. 按電氣和電子工程師學會 (IEEE) 標準528-2001, “重複性” 定義如下: “每次度量時條件或非操作期發生變化, 在相同操作條件下對同一變數多次度量結果的相近程度”。

9.A.4. 在1g的環境中之額定漂移率穩定度小於0.5度/小時 (1 sigma或rms)、可用於1.A.、19.A.1.或19.A.2.所述系統的各式陀螺儀, 以及為其專門設計的組件。

技術註釋：

1. “漂移率” 係陀螺儀輸出中不依靠輸入轉動的那部分, 以角速率表示 (《電氣和電子工程師學會標準》528-2001第2.56段)。
2. “穩定性” 係特定機制或性能係數持續在某種固定作業條件下運作而保持不變的能力的程度 (該定義不適用於動態或伺服穩定性) (《電氣和電子工程師學會標準》528-2001第2.247段)。

9.A.5. 在加速度大於100g之範圍操作的任一類型加速儀或陀螺儀, 以及為此專門設計的組件。

註：

9.A.5. 不包括為測量振動或振盪而設計的加速儀。

9.A.6. 採用9.A.3.或9.A.5.所述加速儀或9.A.4.、9.A.5.所述陀螺儀之慣性設備或其他設備, 以及含有這種設備的系統和為此專門設計的組件。

9.A.3. Linear accelerometers, designed for use in inertial navigation systems or in guidance systems of all types, usable in the systems specified in 1.A., 19.A.1. or 19.A.2., having all of the following characteristics, and specially designed components therefor:

- a. ‘Scale factor’ ‘repeatability’ less (better) than 1250 ppm; and
- b. ‘Bias’ ‘repeatability’ less (better) than 1250 micro g.

Note:

Item 9.A.3. does not control accelerometers specially designed and developed as Measurement While Drilling (MWD) sensors for use in downhole well service operations.

Technical Notes:

1. ‘Bias’ is defined as the accelerometer output when no acceleration is applied.
2. ‘Scale factor’ is defined as the ratio of change in output to a change in the input.
3. The measurement of ‘bias’ and ‘scale factor’ refers to one sigma standard deviation with respect to a fixed calibration over a period of one year.

4. ‘Repeatability’ is defined according to IEEE Standard 528-2001 as follows: ‘The closeness of agreement among repeated measurements of the same variable under the same operating conditions when changes in conditions or non-operating periods occur between measurements’.

9.A.4. All types of gyros usable in the systems specified in 1.A., 19.A.1 or 19.A.2., with a rated ‘drift rate’ ‘stability’ of less than 0.5 degrees (1 sigma or rms) per hour in a 1 g environment, and specially designed components therefor.

Technical Notes:

1. ‘Drift rate’ is defined as the component of gyro output that is functionally independent of input rotation and is expressed as an angular rate. (IEEE STD 528-2001 paragraph 2.56)
2. ‘Stability’ is defined as a measure of the ability of a specific mechanism or performance coefficient to remain invariant when continuously exposed to a fixed operating condition.

(This definition does not refer to dynamic or servo stability.) (IEEE STD 528-2001 paragraph 2.247)

9.A.5. Accelerometers or gyros of any type, designed for use in inertial navigation systems or in guidance systems of all types, specified to function at acceleration levels greater than 100 g, and specially designed components therefor.

Note:

9.A.5. does not include accelerometers that are designed to measure vibration or shock.

9.A.6. Inertial or other equipment using accelerometers specified in 9.A.3. or 9.A.5. or gyros specified in 9.A.4. or 9.A.5., and systems incorporating such equipment, and specially designed components therefor.

9.A.7. 為1.A.、19.A.1.或19.A.2.所述系統設計或改進、且其導航精度（圓算偏差）為200米以下的“整合式導航系統”。

技術註釋：

“典型的”整合式導航系統”包括下列組件：

a. 慣性測量單元（如姿態及航向參考系統、慣性參考單元或慣性導航系統）；

b. 一個或多個外部傳感器，在飛航期間可週期性或連續更新其位置及/或速度（如衛星導航接收機、雷達高度計及/或都卜勒雷達）；以及

c. 整合軟硬體。

註：整合“軟件”請看第9.D.4.項。

9.A.8. 具有以下所有特點的三軸磁航向傳感器及專門為其設計的組件：

a. 傾斜（+/-90度）狀態下內部傾斜補償並帶有滾軸（+/-180度）

b. 以當地磁場為參照，在緯度+/-80度，能夠提供好（低於0.5度的方位精度；以及

c. 在設計上或者經改造後可併入飛行控制系統和導航系統。

註：

第9.A.8.項所述飛行控制和導航系統包括陀螺穩定儀、自動駕駛儀和慣性導航系統。

9.B. 測試及生產設備

9.B.1. 非屬9.B.2.中所描述，而經設計或改進與9.A.所述設備並用的“生產設備”及其他測試、校正與校準設備。

註：

9.B.1.所述設備包括：

a. 用來校準雷射陀螺儀鏡面之儀具，其精度要求如下：

1. 散射計（10 ppm）；

2. 反射計（50 ppm）；

3. 輪廓計（5 Angstroms）；

b. 用於其他慣性設備：

1. 慣性量測單元（IMU模組）測試器。

9.A.7. ‘Integrated navigation systems’, designed or modified for the systems specified in 1.A., 19.A.1. or 19.A.2. and capable of providing a navigational accuracy of 200 m CEP or less.

Technical Note:

An ‘integrated navigation system’ typically incorporates all of the following components:

a. An inertial measurement device (e.g. an attitude and heading reference system, inertial reference unit, or inertial navigation system);

b. One or more external sensors used to update the position and/or velocity, either periodically or continuously throughout the flight (e.g. satellite navigation receiver, radar altimeter, and/or Doppler radar); and

c. Integration hardware and software.

N.B. For integration “software”, see Item 9.D.4.

9.A.8. Three axis magnetic heading sensors having all of the following characteristics, and specially designed components therefor:

a. Internal tilt compensation in pitch (+/- 90 degrees) and having roll (+/- 180 degrees) axes.

b. Capable of providing azimuthal accuracy better (less) than 0.5 degrees rms at latitudes of +/- 80 degrees, referenced to local magnetic field; and

c. Designed or modified to be integrated with flight control and navigation systems.

Note:

Flight control and navigation systems in Item 9.A.8. include gyrostabilisers, automatic pilots and inertial navigation systems.

9.B. TEST AND PRODUCTION EQUIPMENT

9.B.1. “Production equipment”, and other test, calibration and alignment equipment, other than that described in 9.B.2., designed or modified to be used with equipment specified in 9.A.

Note:

Equipment specified in 9.B.1. includes the following:

a. For laser gyro equipment, the following equipment used to characterise mirrors, having the threshold accuracy shown or better:

1. Scatterometer (10 ppm);

2. Reflectometer (50 ppm);

3. Profilometer (5 Angstroms);

b. For other inertial equipment:

1. Inertial Measurement Unit (IMU) Module Tester;

2. 慣性量測單元平台測試器。
3. 慣性量測單元穩定組件固定夾具。
4. 慣性量測單元平台之平衡夾具。
5. 陀螺儀調整測試台。
6. 陀螺儀動平衡工作台。
7. 陀螺儀馬達試車測試工作台。
8. 陀螺儀抽真空及充氮氣工作站。
9. 陀螺儀軸承之離心分離夾具。
10. 加速儀軸向對準工作台。
11. 加速儀測試工作台。
- 9.B.2. 以下設備：
- a. 具下列所述所有特性之平衡機械：
1. 無法平衡重量大於3公斤之轉子/組零件；
 2. 能夠平衡速率大於每分鐘12500轉的轉子/組零件；
 3. 能夠修正兩個或更多平面不平衡；以及
 4. 能夠平衡“殘餘單位失衡”達每公斤轉子重量0.2克-毫米；
- b. 經設計或改進與9.B.2.a.所述機械一併使用之指示計頭（有時稱做平衡儀錶）；
- c. 具下列所有特性之運動模擬器/速率台（能模擬運動之設備）：
1. 兩軸或更多軸；
 2. 在設計上或者經改造可安裝滑環或能傳輸電力信號信息的整合的非接觸裝置，或者二者都可安裝；以及
 3. 具下列任一特性者：
 - a. 具下列所有特性之任一單軸運動模擬器/速率台：
 1. 速率等於或大於400度/秒，或等於或小於30度/秒；以及
 2. 速率分辨率等於或小於6度/秒，精度等於或小於0.6度/秒；
 - b. 最差情況下的速率穩定度在10度範圍以上（含）應為平均正負0.05%或更佳；或
 - c. 定位“精度”相當於或者少於（好於）5弧秒；

2. IMU Platform Tester;

3. IMU Stable Element Handling Fixture;

4. IMU Platform Balance Fixture;

5. Gyro Tuning Test Station;

6. Gyro Dynamic Balance Station;

7. Gyro Run-In/Motor Test Station;

8. Gyro Evacuation and Filling Station;

9. Centrifuge Fixture for Gyro Bearings;

10. Accelerometer Axis Align Station;

11. Accelerometer Test Station.

9.B.2. Equipment as follows:

a. Balancing machines having all the following characteristics:

1. Not capable of balancing rotors/assemblies having a mass greater than 3 kg;

2. Capable of balancing rotors/assemblies at speeds greater than 12,500 rpm;

3. Capable of correcting unbalance in two planes or more; and

4. Capable of balancing to a residual specific unbalance of 0.2 g mm per kg of rotor mass;

b. Indicator heads (sometimes known as balancing instrumentation) designed or modified for use with machines specified in 9.B.2.a.;

c. Motion simulators/rate tables (equipment capable of simulating motion) having all of the following characteristics:

1. Two axes or more;

2. Designed or modified to incorporate sliprings or integrated non-contact devices capable of transferring electrical power, signal information, or both; and

3. Having any of the following characteristics:

a. For any single axis having all of the following:

1. Capable of rates of 400 degrees/s or more, or 30 degrees/s or less; and

2. A rate resolution equal to or less than 6 degrees/s and an accuracy equal to or less than 0.6 degrees/s;

b. Having a worst-case rate stability equal to or better (less) than plus or minus 0.05% averaged over 10 degrees or more; or

c. A positioning “accuracy” equal to or less (better) than 5 arc second;

d. 定位台（能在任一軸上精確旋轉定位之設備）具下列特性：

1. 兩軸以上（含）；及
2. 定位精度相當於或者少於（好於）5 弧秒；

e. 能產生 100g 以上加速度之離心機，且在設計上或者經改造可安裝滑環或者能傳輸電力信號信息的整合非接觸型裝置，或二者都安裝。

註：

1. 第 9 項中所述平衡機械、指示計頭、運動模擬器、速率台、定位台及離心機即為 9.B.2. 中所述者。

2. 為牙科或其他醫療設備所設計或修改之平衡機械不在 9.B.2.a. 管制之中。

3. 為牙科或其他醫療設備所設計或修改之轉台不在 9.B.2.c. 及 9.B.2.d. 管制之中。

4. 具有定位台特性、但不受 9.B.2.c. 所管制之速率台應依 9.B.2.d. 規定予以評定。

5. 具備 9.B.2.d. 所述特性、亦符合 9.B.2.c. 所述特性的設備，將作為 9.B.2.c. 所述設備對待。

6. 無論出口時是否安裝了滑環或整合非接觸型裝置，第 9.B.2.c. 項均適用。

7. 無論出口時是否安裝了滑環或整合非接觸型裝置，第 9.B.2.e. 項均適用。

9.C. 材料

無。

9.D. 軟件

9.D.1. 為 9.A. 或 9.B. 中所述設備的“使用”而專門設計或改進的“軟件”。

9.D.2. 為 9.A.1. 中所述設備之整合“軟件”。

9.D.3. 為 9.A.6. 中所述設備專門設計的整合“軟件”。

9.D.4. 為 9.A.7. 中所述“整合導航系統”專門設計或改進的整合“軟件”。

註：

Kalman 過濾技術是整合“軟件”所用的通用格式。

d. Positioning tables (equipment capable of precise rotary positioning in any axes) having the following characteristics:

1. Two axes or more; and

2. A positioning “accuracy” equal to or less (better) than 5 arc second;

e. Centrifuges capable of imparting accelerations above 100 g and designed or modified to incorporate sliprings or integrated non-contact devices capable of transferring electrical power, signal information, or both.

Notes:

1. The only balancing machines, indicator heads, motion simulators, rate tables, positioning tables and centrifuges specified in Item 9 are those specified in 9.B.2.

2. 9.B.2.a. does not control balancing machines designed or modified for dental or other medical equipment.

3. 9.B.2.c. and 9.B.2.d. do not control rotary tables designed or modified for machine tools or for medical equipment.

4. Rate tables not controlled by 9.B.2.c. and providing the characteristics of a positioning table are to be evaluated according to 9.B.2.d.

5. Equipment that has the characteristics specified in 9.B.2.d. which also meets the characteristics of 9.B.2.c. will be treated as equipment specified in 9.B.2.c.

6. Item 9.B.2.c. applies whether or not sliprings or integrated non-contact devices are fitted at the time of export.

7. Item 9.B.2.e. applies whether or not sliprings or integrated non-contact devices are fitted at the time of export.

9.C. MATERIALS

None.

9.D. SOFTWARE

9.D.1. “Software” specially designed or modified for the “use” of equipment specified in 9.A. or 9.B.

9.D.2. Integration “software” for the equipment specified in 9.A.1.

9.D.3. Integration “software” specially designed for the equipment specified in 9.A.6.

9.D.4. Integration “software”, designed or modified for the “integrated navigation systems” specified in 9.A.7.

Note:

A common form of integration “software” employs Kalman filtering.

9.E. 技術

9.E.1. 依據“一般技術註釋”，指9.A.、9.B.或9.D.所述設備或“軟件”的“研製”、“生產”或“使用”的“技術”。

註：

9.A.或9.D.中所述設備或“軟件”可作有人駕駛飛機、衛星、陸上車輛、航海船隻、潛水艇或地球物理考查設備等的部件出口，或以此類應用之更換件適量出口。

第二類；第 10 項**第10項 飛行控制****10.A. 設備、配裝及組件**

10.A.1. 為1.A.所述系統設計或改進的液壓、機械、光電或機電式飛行控制系統（包括線傳飛控系統）。

10.A.2. 為1.A.所述系統設計或改進的姿態控制設備。

10.A.3. 經設計或修改用於10.A.1.或10.A.2.所述系統、或經設計或改進的可在20赫茲至2千赫茲範圍在超過10 g rms的振動環境下操作飛行控制伺服閥。

註：

10.A.中所述系統、設備或閥可作為有人駕駛飛機或衛星部件出口，或以此類應用之更換件適量出口。

10.B. 測試及生產設備

10.B.1. 為10.A.所述設備專門設計的測試、校正與校準設備。

10.C. 材料

無。

10.D. 軟件

10.D.1. 為10.A.或10.B.中所述設備的“使用”而專門設計或改進的“軟件”。

註：

10.D.1. 中所述“軟件”可作為有人駕駛飛機或衛星部件出口，或以此類應用之更換件適量出口。

10.E. 技術

10.E.1. 為1.A.或19.A.2.所述系統專門設計或修改以整合飛行器機身、推力系統及升力控制面、優化無人駕駛航空飛行器在飛行過程中的空氣動力性能的設計“技術”。

9.E. TECHNOLOGY

9.E.1. “Technology”, in accordance with the General Technology Note, for the “development”, “production” or “use” of equipment or “software” specified in 9.A., 9.B. or 9.D.

Note:

Equipment or “software” specified in 9.A. or 9.D. may be exported as part of a manned aircraft, satellite, land vehicle, marine/submarine vessel or geophysical survey equipment or in quantities appropriate for replacement parts for such applications.

Category II; Item 10**ITEM 10 FLIGHT CONTROL****10.A. EQUIPMENT, ASSEMBLIES AND COMPONENTS**

10.A.1. Hydraulic, mechanical, electro-optical, or electromechanical flight control systems (including fly-by-wire systems) designed or modified for the systems specified in 1.A.

10.A.2. Attitude control equipment designed or modified for the systems specified in 1.A.

10.A.3. Flight control servo valves designed or modified for the systems in 10.A.1. or 10.A.2., and designed or modified to operate in a vibration environment greater than 10 g rms between 20 Hz and 2 kHz.

Note:

Systems, equipment or valves specified in 10.A. may be exported as part of a manned aircraft or satellite or in quantities appropriate for replacement parts for manned aircraft.

10.B. TEST AND PRODUCTION EQUIPMENT

10.B.1. Test, calibration, and alignment equipment specially designed for equipment specified in 10.A.

10.C. MATERIALS

None.

10.D. SOFTWARE

10.D.1. “Software” specially designed or modified for the “use” of equipment specified in 10.A. or 10.B.

Note:

“Software” specified in 10.D.1. may be exported as part of a manned aircraft or satellite or in quantities appropriate for replacement parts for manned aircraft.

10.E. TECHNOLOGY

10.E.1. Design “technology” for integration of air vehicle fuselage, propulsion system and lifting control surfaces, designed or modified for the systems specified in 1.A. or 19.A.2., to optimise aerodynamic performance throughout the flight regime of an unmanned aerial vehicle.

10.E.2. 為1.A.或19.A.2.所述系統專門設計或修改以整合飛控、制導及推進數據載入飛行管理系統、優化火箭系統飛行軌跡的設計“技術”。

10.E.3. 依據“一般技術註釋”，是指10.A.、10.B.或10.D.所述設備或“軟件”的“研製”、“生產”或“使用”的“技術”。

第二類；第 11 項

第11項 航空電子

11.A. 設備、配裝及組件

11.A.1. 為用於1.A.所述系統而設計或改進的雷達及激光雷達系統，包含高度計。

技術註釋：

激光雷達系統為利用鐳射定位、角速度及實體反射特性作回波測距、方向判定及目標辨別，包含特殊的發射、掃描、接收及信號處理技巧。

11.A.2. 為用於1.A.所述系統而設計或改進的能判定特定電磁源方位（方向判定設備）或地形特徵的被動感應器。

11.A.3. 具備下列任一特徵之全球導航衛星系統（GNSS；如GPS、GLONASS或Galileo）的接收器，以及為其專門設計的組件：

- a. 為1.A.所述系統而設計或改進；或
- b. 為空用系統設計或修改，且具備下列任一能力：

1. 能以大於每秒600米的速度提供導航信息；
2. 為軍事或政府機構設計或改進以利用譯碼技術得以撥接GNSS保密信號/數據；或
3. 專門設計具備反干擾特性（如：歸零天線或電子轉向控制天線），可在主動或被動反制措施環境下發揮功能。

註：

為商用、民用或“人身安全”（如數據完整、飛航安全）所設計的控制設備不在11.A.3.b.2.及11.A.3.b.3.管制之內。

11.A.4. 為1.A.或19.A.所述系統設計或改進，並為軍用用途特殊設計、在溫度125攝氏度以上操作的電子套件或組件。

註：

1. 11.A.所述設備包括：
 - a. 地形輪廓成像設備；

10.E.2. Design “technology” for integration of the flight control, guidance, and propulsion data into a flight management system, designed or modified for the systems specified in 1.A. or 19.A.1., for optimisation of rocket system trajectory.

10.E.3. “Technology”, in accordance with the General Technology Note, for the “development”, “production” or “use” of equipment or “software” specified in 10.A., 10.B. or 10.D.

Category II; Item 11

ITEM 11 AVIONICS

11.A. EQUIPMENT, ASSEMBLIES AND COMPONENTS

11.A.1. Radar and laser radar systems, including altimeters, designed or modified for use in the systems specified in 1.A.

Technical Note:

Laser radar systems embody specialised transmission, scanning, receiving and signal processing techniques for utilisation of lasers for echo ranging, direction finding and discrimination of targets by location, radial speed and body reflection characteristics.

11.A.2. Passive sensors for determining bearings to specific electromagnetic sources (direction finding equipment) or terrain characteristics, designed or modified for use in the systems specified in 1.A.

11.A.3. Receiving equipment for Global Navigation Satellite Systems (GNSS; e.g. GPS, GLONASS or Galileo), having any of the following characteristics, and specially designed components therefor:

- a. Designed or modified for use in systems specified in 1.A.; or
- b. Designed or modified for airborne applications and having any of the following:

1. Capable of providing navigation information at speeds in excess of 600 m/s;
2. Employing decryption, designed or modified for military or governmental services, to gain access to GNSS secure signal/data; or
3. Being specially designed to employ anti-jam features (e.g. null steering antenna or electronically steerable antenna) to function in an environment of active or passive countermeasures.

Note:

11.A.3.b.2. and 11.A.3.b.3. do not control equipment designed for commercial, civil or ‘Safety of Life’ (e.g. data integrity, flight safety) GNSS services.

11.A.4. Electronic assemblies and components, designed or modified for use in the systems specified in 1.A. or 19.A. and specially designed for military use and operation at temperatures in excess of 125 °C.

Notes:

1. Equipment specified in 11.A. includes the following:
 - a. Terrain contour mapping equipment;

- b. 景物成像及相關（含數字及模擬）設備；
- c. 都卜勒導航電達系統；
- d. 被動干涉儀設備；
- e. 影像偵測設備（主動及被動）。

2. 11.A.所述設備可作為有人駕駛飛機或衛星部件出口，或以有人駕駛飛機更替部零件適量出口。

11.B. 測試及生產設備

無。

11.C. 材料

無。

11.D. 材料

11.D.1. 為11.A.1.、11.A.2.或11.A.4.中所述設備的“使用”而專門設計或修改的“軟件”。

11.D.2. 為11.A.3.所述設備的“使用”而專門設計的“軟件”。

11.E. 技術

11.E.1. 為保護航空電子及電氣次系統以防止外來電磁脈衝及電磁源干擾危害的設計“技術”如下：

- a. 屏蔽系統的設計“技術”；
- b. 強化防輻射電路及次系統構型的設計“技術”；
- c. 為上述設定強化標準的設計“技術”。

11.E.2. 依據“一般技術註釋”，是指11.A.或11.D.所述設備或“軟件”的“研制”、“生產”或“使用”的“技術”。

第二類；第 12 項

第12項 發射支持

12.A. 設備、配裝及組件

12.A.1. 為1.A.所述系統的貯運、控制、激活及發射而設計或改進的儀具及裝置。

12.A.2. 為1.A.所述系統的貯運、控制、激活及發射用而設計或經改進的飛行器。

12.A.3. 可用在1.A.所述系統經改進靜態或工作狀態精度為 $7 \times 10^{-6} \text{m/sec}^2$ (0.7milligal) 或更佳、達到穩態登記時間至多為2分鐘的機載或艦載重力儀、重力梯度儀及為此專門設計的組件。

b. Scene mapping and correlation (both digital and analogue) equipment;

c. Doppler navigation radar equipment;

d. Passive interferometer equipment;

e. Imaging sensor equipment (both active and passive).

2. Equipment specified in 11.A. may be exported as part of a manned aircraft or satellite or in quantities appropriate for replacement parts for manned aircraft.

11.B. TEST AND PRODUCTION EQUIPMENT

None.

11.C. MATERIALS

None.

11.D. SOFTWARE

11.D.1. “Software” specially designed or modified for the “use” of equipment specified in 11.A.1., 11.A.2. or 11.A.4.

11.D.2. “Software” specially designed for the “use” of equipment specified in 11.A.3.

11.E. TECHNOLOGY

11.E.1. Design “technology” for protection of avionics and electrical subsystems against Electromagnetic Pulse (EMP) and Electromagnetic Interference (EMI) hazards from external sources, as follows:

- a. Design “technology” for shielding systems;
- b. Design “technology” for the configuration of hardened electrical circuits and subsystems;
- c. Design “technology” for determination of hardening criteria for the above.

11.E.2. “Technology”, in accordance with the General Technology Note, for the “development”, “production” or “use” of equipment or “software” specified in 11.A. or 11.D.

Category II; Item 12

ITEM 12 LAUNCH SUPPORT

12.A. EQUIPMENT, ASSEMBLIES AND COMPONENTS

12.A.1. Apparatus and devices, designed or modified for the handling, control, activation and launching of the systems specified in 1.A., 19.A.1., or 19.A.2.

12.A.2. Vehicles designed or modified for the transport, handling, control, activation and launching of the systems specified in 1.A.

12.A.3. Gravity meters (gravimeters), gravity gradiometers, and specially designed components therefor, designed or modified for airborne or marine use, and having a static or operational accuracy of $7 \times 10^{-6} \text{m/s}^2$ (0.7 milligal) or better, with a time to steady-state registration of two minutes or less, usable for systems specified in 1.A.

12.A.4. 為1.A.、19.A.1.或19.A.2.所述系統設計或改進的遙測及遙控設備，包括地面設備。

註：

1. 為有無駕駛飛機或衛星設計或改進的設備不屬12.A.4.管制範圍。

2. 為地面或海面應用系統設計或改進的陸基設備在屬12.A.4管制範圍。

3. 為商業、民用或“人身安全”（如數據完整、飛行安全）GNSS服務設計的設備不屬12.A.4.管制範圍。

12.A.5. 可用於1.A.、19.A.1.或19.A.2.所述系統的精密追蹤系統如下：

a. 安裝在火箭系統或無人駕駛航空飛行器上的採用轉發器的跟蹤系統，該系統連同地面或空中的參考基準或導航衛星系統可提供飛行中位置和速度的即時測量資料；

b. 具有下列所有功能的測距儀雷達（包含相關光學/紅外線追蹤器）：

1. 角分辨率優於1.5毫弧度；

2. 30公里以上的距離分辨率優於10m rms；以及

3. 速度分辨率優於3 m/s。

12.A.6. 為1.A.、19.A.1.或19.A.2.所述系統設計或改造的熱電池。

註：

第12.A.6.項不控制專門為那些“射/航程”達不到300公里的火箭系統或無人駕駛航空器設計的熱電池。

技術註釋：

熱電池為一次性固態非導融熔鹽電解質貯備電池。這些電池含有一種熱解材料，一經點燃，便可熔化電解質，從而啟動電池。

12.B. 測試及生產設備

無。

12.C. 材料

無。

12.D. 軟件

12.D.1. 為12.A.1.所述設備的“使用”而專門設計或改進的“軟件”。

12.A.4. Telemetry and telecontrol equipment, including ground equipment, designed or modified for systems specified in 1.A., 19.A.1. or 19.A.2.

Notes:

1. 12.A.4. does not control equipment designed or modified for manned aircraft or satellites.

2. 12.A.4. does not control ground based equipment designed or modified for terrestrial or marine applications.

3. 12.A.4. does not control equipment designed for commercial, civil or ‘Safety of Life’ (e.g. data integrity, flight safety) GNSS services.

12.A.5. Precision tracking systems, usable for systems specified in 1.A., 19.A.1. or 19.A.2. as follows:

a. Tracking systems which use a code translator installed on the rocket or unmanned aerial vehicle in conjunction with either surface or airborne references or navigation satellite systems to provide real-time measurements of in-flight position and velocity;

b. Range instrumentation radars including associated optical/infrared trackers with all of the following capabilities:

1. Angular resolution better than 1.5 mrad;

2. Range of 30 km or greater with a range resolution better than 10 m rms; and

3. Velocity resolution better than 3 m/s.

12.A.6. Thermal batteries designed or modified for the systems specified in 1.A., 19.A.1. or 19.A.2.

Note:

Item 12.A.6. does not control thermal batteries specially designed for rocket systems or unmanned aerial vehicles that are not capable of a “range” equal to or greater than 300 km.

Technical Note:

Thermal batteries are single use batteries that contain a solid non-conducting inorganic salt as the electrolyte. These batteries incorporate a pyrolytic material that, when ignited, melts the electrolyte and activates the battery.

12.B. TEST AND PRODUCTION EQUIPMENT

None.

12.C. MATERIALS

None.

12.D. SOFTWARE

12.D.1. “Software” specially designed or modified for the “use” of equipment specified in 12.A.1.

12.D.2. 為1.A.所述設備的“使用”而專門設計或修改、可處理飛航後所記錄數據借以判定飛行器飛航路徑全程位置的“軟件”。

12.D.3. 可用在1.A.、19.A.1.或19.A.2.所述系統、為12.A.4.或12.A.5.所述設備的“使用”而專門設計或改進的“軟件”。

12.E. 技術

12.E.1. 依據“一般技術註釋”，指12.A.或12.D.所述設備或“軟件”的“研製”、“生產”或“使用”的“技術”。

12.D.2. “Software” which processes post-flight, recorded data, enabling determination of vehicle position throughout its flight path, specially designed or modified for systems specified in 1.A., 19.A.1. or 19.A.2.

12.D.3. “Software” specially designed or modified for the “use” of equipment specified in 12.A.4. or 12.A.5., usable for systems specified in 1.A., 19.A.1. or 19.A.2.

12.E. TECHNOLOGY

12.E.1. “Technology”, in accordance with the General Technology Note, for the “development”, “production” or “use” of equipment or “software” specified in 12.A. or 12.D.

第二類；第 13 項

第13項 計算機

13.A. 設備、配裝及組件

13.A.1. 具有下列任一特性且為1.A.所述系統使用而設計或改進的模擬計算機、數字計算機或數值微分分析儀：

- a. 可在-45攝氏度至+55攝氏度下連續操作；或
- b. 設計成耐用堅固或抗輻射性。

13.B. 測試及生產設備

無。

13.C. 材料

無。

13.D. 軟件

無。

13.E. 技術

13.E.1. 依據“一般技術註釋”，是指13.A.所述設備的“研製”、“生產”或“使用”。

註：

第13項的設備可作為有人駕駛飛機或衛星的部件出口，或以有人駕駛飛機更替零件適量出口。

第二類；第 14 項

第14項 模擬數字轉換器

14.A. 設備、配裝及組件

14.A.1. 可用於1.A.所述系統中、且具有下列任一特性的模擬數字轉換器：

- a. 經設計符合軍用技術規格，用於耐用堅固設備；或

Category II; Item 13

ITEM 13 COMPUTERS

13.A. EQUIPMENT, ASSEMBLIES AND COMPONENTS

13.A.1. Analogue computers, digital computers or digital differential analysers, designed or modified for use in the systems specified in 1.A., having any of the following characteristics:

- a. Rated for continuous operation at temperatures from below -45 °C to above +55 °C; or
- b. Designed as ruggedised or “radiation hardened”.

13.B. TEST AND PRODUCTION EQUIPMENT

None.

13.C. MATERIALS

None.

13.D. SOFTWARE

None.

13.E. TECHNOLOGY

13.E.1. “Technology”, in accordance with the General Technology Note, for the “development”, “production” or “use” of equipment specified in 13.A.

Note:

Item 13 equipment may be exported as part of a manned aircraft or satellite or in quantities appropriate for replacement parts for manned aircraft.

Category II; Item 14

ITEM 14 ANALOGUE TO DIGITAL CONVERTERS

14.A. EQUIPMENT, ASSEMBLIES AND COMPONENTS

14.A.1. Analogue-to-digital converters, usable in the systems specified in 1.A., having any of the following characteristics:

- a. Designed to meet military specifications for ruggedised equipment; or

b. 軍用用途設計或改進，屬下列任一類型：

1. 具備以下所有特性或經抗輻射強化的模擬數字轉換器微型電路：

- (a) 在二位系統中編碼時相當於8位或更高的量化；
- (b) 可在-54攝氏度以下至+125攝氏度以上範圍內操作；

以及

- (c) 完全密封；或

2. 電氣輸入型的模擬數字轉換器之印刷電路板或模塊具有下列所有特性：

- (a) 在二位元系統中編碼時相當於8位或更高的量化；
- (b) 可在-45攝氏度以下至+55攝氏度以上範圍內操作，以及
- (c) 包含14.A.1.b.1.中所述微型電路。

14.B. 測試及生產設備

無。

14.C. 材料

無。

14.D. 軟件

無。

14.E. 技術

14.E.1. 依據“一般技術註釋”，是指14.A.所述設備的“研製”、“生產”或“使用”。

第二類；第 15 項

第15項 測試設施及設備

15.A. 設備、配裝及組件

無。

15.B. 測試及生產設備

15.B.1. 可用於1.A.、19.A.1.或19.A.2.所述系統或2.A.或20.A.所述次系統的振動測試設備及其組件如下：

a. 利用回饋或密閉回路技術、並包含數字控制器的振動測試系統，可在振頻20赫茲與2000赫茲之間和加速度等於或大於10個標準重力加速度（均方根值）的環境中振動系統，推力等於或大於50千牛頓（空台量測）；

b. Designed or modified for military use and being any of the following types:

1. Analogue-to-digital converter “microcircuits”, which are “radiation-hardened” or have all of the following characteristics:

a. Having a quantisation corresponding to 8 bits or more when coded in the binary system;

b. Rated for operation in the temperature range from below -54 °C to above +125 °C; and

c. Hermetically sealed; or

2. Electrical input type analogue-to-digital converter printed circuit boards or modules, having all of the following characteristics:

a. Having a quantisation corresponding to 8 bits or more when coded in the binary system;

b. Rated for operation in the temperature range from below -45 °C to above +55 °C; and

c. Incorporating “microcircuits” specified in 14.A.1.b.1.

14.B. TEST AND PRODUCTION EQUIPMENT

None.

14.C. MATERIALS

None.

14.D. SOFTWARE

None.

14.E. TECHNOLOGY

14.E.1. “Technology”, in accordance with the General Technology Note, for the “development”, “production” or “use” of equipment specified in 14.A.

Category II; Item 15

ITEM 15 TEST FACILITIES AND EQUIPMENT

15.A. EQUIPMENT, ASSEMBLIES AND COMPONENTS

None.

15.B. TEST AND PRODUCTION EQUIPMENT

15.B.1. Vibration test equipment, usable for the systems specified in 1.A., 19.A.1. or 19.A.2. or the subsystems specified in 2.A. or 20.A., and components therefor, as follows:

a. Vibration test systems employing feedback or closed loop techniques and incorporating a digital controller, capable of vibrating a system at an acceleration equal to or greater than 10 g rms between 20 Hz and 2 kHz while imparting forces equal to or greater than 50 kN, measured ‘bare table’;

b. 結合專門設計的振動測試軟件的數字控制器，帶有一個大於5千赫的“實時控制帶寬”，是為使用15.B.1.a.所述振動測試系統而設計的；

技術註釋：

“實時控制帶寬”的定義是，控制器執行從抽樣、處理數據到傳輸控制信號整個週期能夠達到的極限速度。

c. 振動推衝器（振盪單元），無論有無相關放大器，推力等於或大於50千牛頓（空台量測），並可用於15.B.1.a.所述振動測試系統；

d. 測試片支持結構及電子單元，經設計將多重振盪器與完整振盪器系統相結合，這種系統的有效合力等於或大於50千牛頓（空台量測），並可用於15.B.1.a.所述振動測試系統。

技術註釋：

包含數字控制器的振動測試系統的功能可部分或全部由預貯及數字編碼電子信號自動控制。

15.B.2. 可用於1.A.或19.A.所述系統或2.A.或20.A.所述次系統、速度達0.9馬赫以上風洞。

15.B.3. 可用於1.A.、19.A.1.或19.A.2.所述系統或2.A.或20.A.所述次系統、可承受推力達68千牛頓以上固體與液體燃料推進火箭、發動機或引擎測試台/架，或可同時測量三軸推力分量的測試台/架。

15.B.4. 可用於1.A.或19.A.所述系統或2.A.或20.A.所述次系統的環境模擬室如下：

a. 能模擬下列所有飛行情況的環境模擬室：

1. 下列任一情況：

a. 高度在15公里以上；或

b. 溫度範圍從攝氏-50度以下至125度以上。

2. 加入或在設計中或經改造加入一個振動器或者其他測試振動的設備，生成一個在振頻20赫茲與2000赫茲間加速度等於或大於10個標準重力加速度（均方根值）（空台量測）、推力等於或大於50千牛頓的振動環境；及

技術註釋：

1. 第15.B.4.a.2.項描述了能夠生成單波振動環境的系統和能產生寬幅無規則振動（即功率譜）的系統。

2. 第15.B.4.a.2.項中的“設計中”或“經改造”，係指環境模擬室提供適宜的界面（例如，密封裝置）以加入該項所述振動器或者其他測試振動的設備。

b. Digital controllers, combined with specially designed vibration test “software”, with a ‘real-time control bandwidth’ greater than 5 kHz and designed for use with vibration test systems specified in 15.B.1.a.;

Technical Note:

‘Real-time control bandwidth’ is defined as the maximum rate at which a controller can execute complete cycles of sampling, processing data and transmitting control signals.

c. Vibration thrusters (shaker units), with or without associated amplifiers, capable of imparting a force equal to or greater than 50 kN, measured ‘bare table’, and usable in vibration test systems specified in 15.B.1.a.;

d. Test piece support structures and electronic units designed to combine multiple shaker units into a complete shaker system capable of providing an effective combined force equal to or greater than 50 kN, measured ‘bare table’, and usable in vibration test systems specified in 15.B.1.a.

Technical Note:

Vibration test systems incorporating a digital controller are those systems, the functions of which are, partly or entirely, automatically controlled by stored and digitally coded electrical signals.

15.B.2. Wind-tunnels for speeds of Mach 0.9 or more, usable for the systems specified in 1.A. or 19.A. or the subsystems specified in 2.A. or 20.A.

15.B.3. Test benches/stands, usable for the systems specified in 1.A., 19.A.1. or 19.A.2. or the subsystems specified in 2.A. or 20.A., which have the capacity to handle solid or liquid propellant rockets, motors or engines having a thrust greater than 68 kN, or which are capable of simultaneously measuring the three axial thrust components.

15.B.4. Environmental chambers as follows, usable for the systems specified in 1.A. or 19.A. or the subsystems specified in 2.A. or 20.A.:

a. Environmental chambers capable of simulating all the following flight conditions:

1. Having any of the following:

a. Altitude equal to or greater than 15 km; or

b. Temperature range from below -50 °C to above 125 °C; and

2. Incorporating, or designed or modified to incorporate, a shaker unit or other vibration test equipment to produce vibration environments equal to or greater than 10 g rms, measured ‘bare table’, between 20 Hz and 2 kHz imparting forces equal to or greater than 5 kN;

Technical Notes:

1. Item 15.B.4.a.2. describes systems that are capable of generating a vibration environment with a single wave (e.g. a sine wave) and systems capable of generating a broad band random vibration (i.e. power spectrum).

2. In Item 15.B.4.a.2., designed or modified means the environmental chamber provides appropriate interfaces (e.g. sealing devices) to incorporate a shaker unit or other vibration test equipment as specified in this Item.

b. 能模擬下列所有飛行情況的環境模擬室：

1. 音壓大於140dB（相當於 2×10^{-5} N/m²壓力）或音量輸出功率在4千瓦以上的音響環境；及

2. 下列任一情況：

a. 高度在15公里以上；或

b. 溫度範圍從攝氏-50度以下至125度以上。

15.B.5. 可用於1.A.、19.A.1.或19.A.2.所述系統或2.A.或20.A.所述次系統，借產生軔致輻射（bremsstrahlung）作用而從2MeV以上加速電子釋出電磁輻射的加速器，以及包含這些加速器的設備。

註：

專為醫用目的而設計的設備不在15.B.5.管制範圍。

技術註釋：

在15.B.中，“空台”指沒有夾具或接頭的平台或表面。

15.C. 材料

無。

15.D. 軟件

15.D.1. 可用於1.A.、19.A.1.或19.A.2.所述測試系統或2.A.或20.A.所述次系統、為15.B.所述設備的“使用”而專門設計或改進的“軟件”。

15.E. 技術

15.E.1. 依據“一般技術註釋”，是指15.B.或15.D.所述設備或“軟件”的“研制”、“生產”或“使用”的“技術”。

第二類；第 16 項

第16項 計算機建模-模擬及設計整合

16.A. 設備、配裝及組件

16.A.1. 可用於1.A.所述系統或2.A.所述次系統的計算機建模、模擬或設計整合而專門設計的複合（結合數字/模擬）計算器。

註：

本項管制僅適用於配備有16.D.1.所述軟件的設備。

16.B. 測試及生產設備

無。

b. Environmental chambers capable of simulating all of the following flight conditions:

1. Acoustic environments at an overall sound pressure level of 140 dB or greater (referenced to 2×10^{-5} N/m²) or with a total rated acoustic power output of 4 kW or greater; and

2. Any of the following:

a. Altitude equal to or greater than 15 km; or

b. Temperature range from below -50°C to above 125°C.

15.B.5. Accelerators capable of delivering electromagnetic radiation produced by bremsstrahlung from accelerated electrons of 2 MeV or greater, and equipment containing those accelerators, usable for the systems specified in 1.A., 19.A.1. or 19.A.2. or the subsystems specified in 2.A. or 20.A.

Note:

15.B.5. does not control equipment specially designed for medical purposes.

Technical Note:

In Item 15.B. 'bare table' means a flat table, or surface, with no fixture or fittings.

15.C. MATERIALS

None.

15.D. SOFTWARE

15.D.1. "Software" specially designed or modified for the "use" of equipment specified in 15.B. usable for testing systems specified in 1.A., 19.A.1. or 19.A.2. or subsystems specified in 2.A. or 20.A.

15.E. TECHNOLOGY

15.E.1. "Technology", in accordance with the General Technology Note, for the "development", "production" or "use" of equipment or "software" specified in 15.B. or 15.D.

Category II; Item 16

ITEM 16 MODELLING-SIMULATION AND DESIGN INTEGRATION

16.A. EQUIPMENT, ASSEMBLIES AND COMPONENTS

16.A.1. Specially designed hybrid (combined analogue/digital) computers for modelling, simulation or design integration of systems specified in 1.A. or the subsystems specified in 2.A.

Note:

This control only applies when the equipment is supplied with "software" specified in 16.D.1.

16.B. TEST AND PRODUCTION EQUIPMENT

None.

16.C. 材料

無。

16.D. 軟件

16.D.1. 可用在1.A.所述測試系統或2.A.或20.A.所述次系統中為計算機建模、模擬或設計整合而專門設計的“軟件”。

技術註釋：

建模特別包括該系統的空氣動力及熱力分析。

16.E. 技術

16.E.1. 依據“一般技術註釋”，是指16.A.或16.D.所述設備或“軟件”的“研製”、“生產”或“使用”的“技術”。

16.C. MATERIALS

None.

16.D. SOFTWARE

16.D.1. “Software” specially designed for modelling, simulation, or design integration of the systems specified in 1.A. or the subsystems specified in 2.A or 20.A.

Technical Note:

The modelling includes in particular the aerodynamic and thermodynamic analysis of the systems.

16.E. TECHNOLOGY

16.E.1. “Technology”, in accordance with the General Technology Note, for the “development”, “production” or “use” of equipment or “software” specified in 16.A. or 16.D.

第二類；第 17 項**Category II; Item 17****第17項 隱形****ITEM 17 STEALTH****17.A. 設備、配裝及組件****17.A. EQUIPMENT, ASSEMBLIES AND COMPONENTS**

17.A.1. 可用在1.A.或19.A.所述測試系統或2.A.或20.A.所述次系統中，為降低可觀測性，例如雷達反射率，紫外線/紅外線跡訊及音響信號（亦即隱形科技）所用裝置。

17.A.1. Devices for reduced observables such as radar reflectivity, ultraviolet/infrared signatures and acoustic signatures (i.e. stealth technology), for applications usable for the systems specified in 1.A. or 19.A. or the subsystems specified in 2.A. or 20.A.

17.B. 測試及生產設備**17.B. TEST AND PRODUCTION EQUIPMENT**

17.B.1. 可用在1.A.、19.A.1.或19.A.2.所述測試系統或2.A.所述次系統中，專門設計的雷達反射截面積量測系統。

17.B.1. Systems, specially designed for radar cross section measurement, usable for the systems specified in 1.A., 19.A.1. or 19.A.2. or the subsystems specified in 2.A.

17.C. 材料**17.C. MATERIALS**

17.C.1. 可用在1.A.或19.A.所述測試系統或2.A.所述次系統中，為降低可觀測性，例如雷達反射率，紫外線/紅外線信號及聲學信號（亦即隱形技術）所用材料。

17.C.1. Materials for reduced observables such as radar reflectivity, ultraviolet/infrared signatures and acoustic signatures (i.e. stealth technology), for applications usable for the systems specified in 1.A. or 19.A. or the subsystems specified in 2.A.

註：***Notes:***

1. 17.C.1.包括為減少或裁制微波反射率或發射率而專門設計的結構材料及塗料（包括漆）。

1. 17.C.1. includes structural materials and coatings (including paints), specially designed for reduced or tailored reflectivity or emissivity in the microwave, infrared or ultraviolet spectra.

2. 17.C.1.衛星熱控制專用塗料（包括漆）則不在17.C.1.管制範圍。

2. 17.C.1. does not control coatings (including paints) when specially used for thermal control of satellites.

17.D. 軟件**17.D. SOFTWARE**

17.D.1. 可用在1.A.或19.A.所述系統或2.A.所述次系統中，為降低可觀測性，例如雷達反射率，紫外線/紅外線信號及聲學信號（亦即隱形技術）而專門設計的“軟件”。

17.D.1. “Software” specially designed for reduced observables such as radar reflectivity, ultraviolet/infrared signatures and acoustic signatures (i.e. stealth technology), for applications usable for the systems specified in 1.A. or 19.A. or the subsystems specified in 2.A.

註：***Note:***

17.D.1. 包括為分析減少信號而專門設計的“軟件”。

17.D.1. includes “software” specially designed for analysis of signature reduction.

17.E. 技術

17.E.1. 依據“一般技術註釋”，是指17.A.、17.B.、17.C.或17.D.所述設備、材料或“軟件”的“研製”、“生產”或“使用”的“技術”。

註：

17.E.1. 包括為分析減少信號而專門設計的“數據庫”。

第二類；第 18 項

第18項 核效應防護

18.A. 設備、配裝及組件

18.A.1. 可用在1.A.所述系統中，為抗核效應（例如電磁脈衝（EMP）、X射線、衝擊波和熱輻射綜合效應）、保護火箭及無人駕駛航空飛行器的“抗輻射加固”的微電路。

18.A.2. 可用在1.A.所述系統中，為抗核效應（例如電磁脈衝（EMP）、X射線、衝擊波和熱輻射綜合效應）、保護火箭及無人駕駛航空飛行器而專門設計的“探測器”。

技術註釋：

“探測器”是指能夠自動辨識及記錄或登記外來刺激的機械式、電子式、光學式或化學式設備。該外來刺激如：周遭環境的壓力或溫度變化、放射性物質所發出的電子或電磁信號或輻射。這包括僅操作一次的感知或以失效作為感測方式的裝置。

18.A.3. 可用在1.A.所述系統中，為抗核效應（例如電磁脈衝（EMP）、X射線、衝擊波和熱輻射綜合效應）、保護火箭及無人駕駛航空飛行器而設計可承受 4.184×10^6 焦耳/平方厘米以上且其壓力峰值大於千帕熱爆震的鼻錐罩。

18.B. 測試及生產設備

無。

18.C. 材料

無。

18.D. 軟件

無。

18.E. 技術

18.E.1. 依據“一般技術註釋”，是指與18.A.所述設備的“研製”、“生產”或“使用”的“技術”。

17.E. TECHNOLOGY

17.E.1. “Technology”, in accordance with the General Technology Note, for the “development”, “production” or “use” of equipment, materials or “software” specified in 17.A., 17.B., 17.C. or 17.D.

Note:

17.E.1. includes databases specially designed for analysis of signature reduction.

Category II; Item 18

ITEM 18 NUCLEAR EFFECTS PROTECTION

18.A. EQUIPMENT, ASSEMBLIES AND COMPONENTS

18.A.1. “Radiation Hardened” “microcircuits” usable in protecting rocket systems and unmanned aerial vehicles against nuclear effects (e.g. Electromagnetic Pulse (EMP), X-rays, combined blast and thermal effects), and usable for the systems specified in 1.A.

18.A.2. ‘Detectors’ specially designed or modified to protect rocket systems and unmanned aerial vehicles against nuclear effects (e.g. Electromagnetic Pulse (EMP), X-rays, combined blast and thermal effects), and usable for the systems specified in 1.A.

Technical Note:

A ‘detector’ is defined as a mechanical, electrical, optical or chemical device that automatically identifies and records, or registers a stimulus such as an environmental change in pressure or temperature, an electrical or electromagnetic signal or radiation from a radioactive material. This includes devices that sense by one time operation or failure.

18.A.3. Radomes designed to withstand a combined thermal shock greater than 4.184×10^6 J/m² accompanied by a peak over pressure of greater than 50 kPa, usable in protecting rocket systems and unmanned aerial vehicles against nuclear effects (e.g. Electromagnetic Pulse (EMP), X-rays, combined blast and thermal effects), and usable for the systems specified in 1.A.

18.B. TEST AND PRODUCTION EQUIPMENT

None.

18.C. MATERIALS

None.

18.D. SOFTWARE

None.

18.E. TECHNOLOGY

18.E.1. “Technology”, in accordance with the General Technology Note, for the “development”, “production” or “use” of equipment specified in 18.A.

第二類；第 19 項

Category II; Item 19

第19項 其他完整的投送系統

19.A. 設備、配裝及組件

19.A.1. 在1.A.1.中未述及、而射/航程等於或大於300公里的完整火箭系統（包含彈道導彈系統、航天運載火箭及探空火箭）。

19.A.2. 在1.A.2.中未述及、而射/航程等於或大於300公里的完整無人駕駛航空飛行器系統（包含巡航導彈系統、靶機及無人偵察機）。

19.A.3. 在1.A.2.或19.A.2.中未述及、具有下列所有特徵的完整無人駕駛航空器系統：

a. 具有下列任一特徵：

1. 擁有自動駕駛儀和導航能力；或
2. 具備從有人操作的直視範圍轉入控制飛行的能力；且

b. 具有下列任一特徵：

1. 包含容量為20公升以上的氣霧劑噴射系統/裝置；或
2. 為配備容量為20公升以上的氣霧劑噴射系統/裝置而設計或改進。

註：

為娛樂或競賽專門設計的模型飛機不屬19.A.3.的管制範圍。

技術註釋：

1. 氣霧劑由燃料成分以外的微粒或液體、副產品或添加物組成，是“有效載荷”的一部分，在大氣中噴灑。氣霧劑的例子包括用於作物噴灑的農藥和人工催雨用的乾化學品。

2. 氣霧劑噴射系統/裝置包括儲存或大氣噴灑氣霧劑所需的所有器具（機械、電氣、液壓等）。這包括能將氣霧劑噴入燃燒排氣蒸汽、噴入推進器滑流。

19.B. 測試及生產設備

無。

19.C. 材料

無。

19.D. 軟件

19.D.1. 為“使用”在19.A.所述系統而專門設計或改進、可協調一個以上次系統運作功能的“軟件”。

ITEM 19 OTHER COMPLETE DELIVERY SYSTEMS

19.A. EQUIPMENT, ASSEMBLIES AND COMPONENTS

19.A.1. Complete rocket systems (including ballistic missile systems, space launch vehicles, and sounding rockets), not specified in 1.A.1., capable of a “range” equal to or greater than 300 km.

19.A.2. Complete unmanned aerial vehicle systems (including cruise missile systems, target drones and reconnaissance drones), not specified in 1.A.2., capable of a “range” equal to or greater than 300 km.

19.A.3. Complete unmanned aerial vehicle systems, not specified in 1.A.2. or 19.A.2., having all of the following:

a. Having any of the following:

1. An autonomous flight control and navigation capability; or
2. Capability of controlled flight out of the direct vision range involving a human operator; and

b. Having any of the following:

1. Incorporating an aerosol dispensing system/mechanism with a capacity greater than 20 litres; or
2. Designed or modified to incorporate an aerosol dispensing system/mechanism with a capacity greater than 20 litres.

Note:

Item 19.A.3. does not control model aircraft, specially designed for recreational or competition purposes.

Technical Notes:

1. An aerosol consists of particulate or liquids other than fuel components, by-products or additives, as part of the “payload” to be dispersed in the atmosphere. Examples of aerosols include pesticides for crop dusting and dry chemicals for cloud seeding.

2. An aerosol dispensing system/mechanism contains all those devices (mechanical, electrical, hydraulic, etc.), which are necessary for storage and dispersion of an aerosol into the atmosphere. This includes the possibility of aerosol injection into the combustion exhaust vapour and into the propeller slip stream.

19.B. TEST AND PRODUCTION EQUIPMENT

19.B.1. “Production facilities” specially designed for the systems specified in 19.A.1 or 19.A.2.

19.C. MATERIALS

None.

19.D. SOFTWARE

19.D.1. “Software” which coordinates the function of more than one subsystem, specially designed or modified for “use” in the systems specified in 19.A.1. or 19.A.2.

19.E. 技術

19.E.1. 依據“一般技術註釋”，是指19.A.所述設備的“研製”、“生產”或“使用”的“技術”。

第二類；第 20 項**第20項 其他完整次系統****20.A. 設備、配裝及組件**

20.A.1. 完整次系統如下：

a. 可用於19.A.所述系統中、但在2.A.1.中未述及的火箭各級；

b. 可用於19.A.所述系統中、但在2.A.1.中未述及的總沖等於或大於 8.41×10^5 牛頓/秒、但小於 1.1×10^6 牛頓/秒的固體或液體推進劑火箭發動機。

20.B. 測試及生產設備

20.B.1. 為20.A.所述次系統專門設計的“生產設施”。

20.B.2. 為20.A.所述次系統專門設計的“生產設備”。

20.C. 材料

無。

20.D. 軟件

20.D.1. 為20.B.1.所述系統而專門設計或改進的“軟件”。

20.D.2. 在2.D.2.中未述及、為“使用”在20.A.1.b.所述火箭發動機或引擎而專門設計或改進的“軟件”。

20.E. 技術

20.E.1. 依據“一般技術註釋”，是指20.A.、20.B.或20.D.所述設備或“軟件”的“研製”、“生產”或“使用”的“技術”。

單位，常數，縮略語和簡稱**本附件所用單位，常數，縮略語和簡稱**

ABEC	環形軸承工程師委員會
ABMA	美國軸承製造商協會
ANSI	美國國家標準學會
Angstrom	埃 1×10^{-10} 米
ASTM	美國材料與試驗協會

19.E. TECHNOLOGY

19.E.1. “Technology”, in accordance with the General Technology Note, for the “development”, “production” or “use” of equipment specified in 19.A. 1. or 19.A.2.

Category II; Item 20**ITEM 20 OTHER COMPLETE SUBSYSTEMS****20.A. EQUIPMENT, ASSEMBLIES AND COMPONENTS**

20.A.1. Complete subsystems as follows:

a. Individual rocket stages, not specified in 2.A.1., usable in systems specified in 19.A.;

b. Solid propellant rocket motors, hybrid rocket motors or liquid propellant rocket engines, not specified in 2.A.1., usable in systems specified in 19.A., having a total impulse capacity equal to or greater than 8.41×10^5 Ns, but less than 1.1×10^6 Ns.

20.B. TEST AND PRODUCTION EQUIPMENT

20.B.1. “Production facilities” specially designed for the subsystems specified in 20.A.

20.B.2. “Production equipment” specially designed for the subsystems specified in 20.A.

20.C. MATERIALS

None.

20.D. SOFTWARE

20.D.1. “Software” specially designed or modified for the systems specified in 20.B.1.

20.D.2. “Software”, not specified in 2.D.2., specially designed or modified for the “use” of rocket motors or engines specified in 20.A.1.b.

20.E. TECHNOLOGY

20.E.1. “Technology”, in accordance with the General Technology Note, for the “development”, “production” or “use” of equipment or “software” specified in 20.A., 20.B. or 20.D.

Units, constants, acronyms and abbreviations**UNITS, CONSTANTS, ACRONYMS AND ABBREVIATIONS USED IN THIS ANNEX**

ABEC	Annular Bearing Engineers Committee
ABMA	American Bearing Manufacturers Association
ANSI	American National Standards Institute
Angstrom	1×10^{-10} metre
ASTM	American Society for Testing and Materials

巴	氣壓單位	bar	unit of pressure
°C	攝氏度	°C	degree Celsius
cc	立方厘米	cc	cubic centimetre
CAS	化學文摘社	CAS	Chemical Abstracts Service
CEP	圓概率均等	CEP	Circle of Equal Probability
dB	分貝	dB	decibel
g	克；另，重力加速度	g	gram; also, acceleration due to gravity
GHz	千兆赫	GHz	gigahertz
GNSS	全球導航衛星系統，例如， “Galileo” “GLONASS”——全球導航衛星系統 “GPS”——全球定位系統	GNSS	Global Navigation Satellite System e.g. ‘Galileo’ ‘GLONASS’ – Global’naya Navigatsionnaya Sputnikovaya Sistema ‘GPS’ – Global Positioning System
h	小時	h	hour
Hz	赫茲	Hz	hertz
HTPB	端羟基聚丁二烯	HTPB	Hydroxy-Terminated Polybutadiene
ICAO	國際民用航空組織	ICAO	International Civil Aviation Organisation
IEEE	電機及電子學工程師聯合會	IEEE	Institute of Electrical and Electronic Engineers
IR	紅外線	IR	Infrared
ISO	國際標準化組織	ISO	International Organization for Standardization
J	焦耳	J	joule
JIS	日本工業標準	JIS	Japanese Industrial Standard
K	開爾文	K	Kelvin
kg	公斤	kg	kilogram
kHz	千赫	kHz	kilohertz
km	公里	km	kilometre
kN	千牛頓	kN	kilonewton
kPa	千帕斯卡爾	kPa	kilopascal
kW	千瓦	kW	kilowatt
m	米	m	metre
MeV	兆電子伏	MeV	million electron volt or mega electron volt
MHz	兆赫	MHz	megahertz
milligal	10 ⁻⁵ m/s ² (毫伽)	milligal	10 ⁻⁵ m/s ² (also called mGal, mgal or milligalileo)
mm	毫米	mm	millimetre
mm Hg	毫米汞柱	mm Hg	mm of mercury

MPa	兆帕	MPa	megapascal
mrاد	毫弧度	mrاد	milliradian
ms	毫秒	ms	millisecond
μm	微米	μm	micrometre
N	牛頓	N	newton
Pa	帕斯卡	Pa	pascal
ppm	百萬分之一	ppm	parts per million
拉德 (Si)	輻射吸收劑量	rads (Si)	radiation absorbed dose
RF	無線電頻率	RF	radio frequency
rms	均方根	rms	root mean square
rpm	每分鐘轉數	rpm	revolutions per minute
RV	重返大氣層運載工具	RV	Re-entry Vehicles
s	秒	s	second
Tg	玻璃轉化溫度	Tg	glass transition temperature
Tyler	泰勒網目尺寸，或泰勒標準篩系列	Tyler	Tyler mesh size, or Tyler standard sieve series
UAV	無人駕駛航空器	UAV	Unmanned Aerial Vehicle
UV	紫外線	UV	Ultra violet

換算表

單位 (從)	單位 (至)	換算
巴	帕斯卡 (帕)	1巴=100千帕
克 (重力)	m/s ²	1克=9.806 65 m/s ²
毫弧度	度 (角)	1毫弧度0.0573°
拉德	爾格/克矽	1拉德 (Si) =100爾格/克矽 (= 0.01 戈瑞)
泰勒篩制250網目	毫米	泰勒篩制250網目的篩孔為0.063毫米

Last updated 2 May 2012

LIST OF ENTITIES, GOODS AND INDIVIDUALS SUBJECT TO THE MEASURES IMPOSED BY PARAGRAPH 8 OF RESOLUTION 1718 (2006) AS MODIFIED BY RESOLUTION 1874 (2009)

A) Entities

The Committee designated the following entities to be subject to the measures imposed in paragraph 8(d) of resolution 1718 (2006):

1. KOREA MINING DEVELOPMENT TRADING CORPORATION (a.k.a. CHANGGWANG SINYONG CORPORATION; a.k.a. EXTERNAL TECHNOLOGY GENERAL

Table of conversions

Unit (from)	Unit (to)	Conversion
bar	pascal (Pa)	1 bar = 100 kPa
g (gravity)	m/s ²	1 g = 9.806 65 m/s ²
mrاد (millirad)	degrees (angle)	1 mrاد ≈ 0.0573°
rads	ergs/gram of Si	1 rad (Si) = 100 ergs/gram of silicon (= 0.01 gray [Gy])
Tyler 250 mesh	mm	for a Tyler 250 mesh, mesh opening 0.063 mm

LISTA DAS ENTIDADES, BENS E PESSOAS SINGULARES SUJEITOS ÀS MEDIDAS IMPOSTAS NO N.º 8 DA RESOLUÇÃO N.º 1718 (2006), TAL COMO MODIFICADA PELA RESOLUÇÃO N.º 1874 (2009)

(actualizada à data de 2 de Maio de 2012)

A) Entidades

O Comité designou as seguintes entidades a serem sujeitas às medidas impostas na alínea d) do n.º 8 da Resolução n.º 1718 (2006):

1. KOREA MINING DEVELOPMENT TRADING CORPORATION (Também conhecida por: CHANGGWANG SINYONG CORPORATION; EXTERNAL TECHNOLOGY

CORPORATION; a.k.a. DPRKN MINING DEVELOPMENT TRADING COOPERATION; a.k.a. “KOMID”). Central District, Pyongyang, DPRK. Primary arms dealer and main exporter of goods and equipment related to ballistic missiles and conventional weapons.

2. KOREA RYONBONG GENERAL CORPORATION (a.k.a. KOREA YONBONG GENERAL CORPORATION; f.k.a. LYONGAKSAN GENERAL TRADING CORPORATION). Pot’onggang District, Pyongyang, DPRK; Rakwon-dong, Pothonggang District, Pyongyang, DPRK. Defense conglomerate specializing in acquisition for DPRK defense industries and support to that country’s military-related sales.

3. TANCHON COMMERCIAL BANK (f.k.a. CHANGGWANG CREDIT BANK; f.k.a., KOREA CHANGGWANG CREDIT BANK). Saemul 1-Dong Pyongchon District, Pyongyang, DPRK. Main DPRK financial entity for sales of conventional arms, ballistic missiles, and goods related to the assembly and manufacture of such weapons.

4. NAMCHONGANG TRADING CORPORATION

Description: Namchongang is a DPRK trading company subordinate to the General Bureau of Atomic Energy (GBAE). Namchongang has been involved in the procurement of Japanese origin vacuum pumps that were identified at a DPRK nuclear facility, as well as nuclear-related procurement associated with a German individual. It has further been involved in the purchase of aluminum tubes and other equipment specifically suitable for a uranium enrichment program from the late 1990s. Its representative is a former diplomat who served as DPRK’s representative for the IAEA inspection of the Yongbyon nuclear facilities in 2007. Namchongang’s proliferation activities are of grave concern given the DPRK’s past proliferation activities.

Location: Pyongyang, DPRK.

A.K.A.: NCG; NAMCHONGANG TRADING; NAMCHONGANG CORPORATION; NOMCHONGANG TRADING CO.; NAM CHONG GAN TRADING CORPORATION

5. HONG KONG ELECTRONICS

Description: owned or controlled by, or acts or purports to act for or on behalf of Tanchon Commercial Bank and KOMID. Hong Kong Electronics has transferred millions of dollars of proliferation-related funds on behalf of Tanchon Commercial Bank and KOMID (both designated by the Committee in April 2009) since 2007. Hong Kong Electronics has facilitated the movement of money from Iran to the DPRK on behalf of KOMID.

Location: Sanaee St., Kish Island, Iran.

A.K.A.: HONG KONG ELECTRONICS KISH CO.

6. KOREA HYOKSIN TRADING CORPORATION

Description: a DPRK company based in Pyongyang that is subordinate to Korea Ryonbong General Corporation (desig-

GENERAL CORPORATION; DPRKN MINING DEVELOPMENT TRADING COOPERATION; «KOMID»). Distrito Central, Pyongyang, RPDC. Principal negociante de armas e principal exportador de bens e equipamentos relacionados com mísseis balísticos e armas convencionais.

2. KOREA RYONBONG GENERAL CORPORATION (Também conhecida por: KOREA YONBONG GENERAL CORPORATION; anteriormente conhecida por: LYONGAKSAN GENERAL TRADING CORPORATION). Distrito de Pot’onggang, Pyongyang, RPDC; Rakwon-dong, Distrito de Pothonggang, Pyongyang, RPDC. Conglomerado de defesa especializado em aquisições para a indústria da defesa da RPDC e no apoio às vendas deste país relacionadas com material militar.

3. TANCHON COMMERCIAL BANK (Anteriormente conhecido por: CHANGGWANG CREDIT BANK; KOREA CHANGGWANG CREDIT BANK). Distrito de Saemul 1-Dong Pyongchon, Pyongyang, RPDC. Principal entidade financeira da RPDC para a venda de armas convencionais, mísseis balísticos e bens relacionados com a montagem e fabrico dessas armas.

4. NAMCHONGANG TRADING CORPORATION

Descrição: A Namchongang é uma sociedade comercial da RPDC, dependente do Secretariado-Geral da Energia Atómica (GBAE). A Namchongang participou na aquisição de bombas de vácuo de origem japonesa que foram identificadas numa instalação nuclear da RPDC, bem como em aquisições no sector nuclear, em associação com um cidadão alemão. Além disso, participou, desde o final da década de 1990, na aquisição de tubos de alumínio e de outro equipamento especialmente vocacionado para um programa de enriquecimento de urânio. O seu representante é um antigo diplomata que representou a RPDC na inspecção da Agência Internacional da Energia Atómica (AIEA), em 2007, às instalações nucleares de Yongbyon. As actividades de proliferação da Namchongang constituem um grave motivo de preocupação atendendo às actividades de proliferação desenvolvidas no passado pela RPDC.

Localização: Pyongyang, RPDC.

Também conhecida por: NCG; NAMCHONGANG TRADING; NAMCHONGANG CORPORATION; NOMCHONGANG TRADING CO.; NAM CHONG GAN TRADING CORPORATION

5. HONG KONG ELECTRONICS

Descrição: A Hong Kong Electronics é propriedade do Tanchon Commercial Bank e da KOMID, ou por eles controlada, ou actua ou afirma actuar em seu nome. A empresa transferiu, desde 2007, milhões de dólares de verbas relacionadas com a proliferação em nome do Tanchon Commercial Bank e da KOMID (ambos designados pelo Comité em Abril de 2009). A Hong Kong Electronics actuou como intermediário na transferência de capitais do Irão para a RPDC em nome da KOMID.

Localização: Rua Sanaee, Ilha de Kish, Irão.

Também conhecida por: HONG KONG ELECTRONICS KISH CO.

6. KOREA HYOKSIN TRADING CORPORATION

Descrição: Empresa da RPDC sediada em Pyongyang, dependente da Korea Ryonbong General Corporation (designada

nated by the Committee in April 2009) and is involved in the development of WMD.

Location: Rakwon-dong, Pothonggang District, Pyongyang, DPRK.

A.K.A.: KOREA HYOKSIN EXPORT AND IMPORT CORPORATION

7. GENERAL BUREAU OF ATOMIC ENERGY (GBAE)

Description: The GBAE is responsible for the DPRK's nuclear program, which includes the Yongbyon Nuclear Research Center and its 5 MWe (25 MWt) plutonium production research reactor, as well as its fuel fabrication and reprocessing facilities. The GBAE has held nuclear-related meetings and discussions with the International Atomic Energy Agency. GBAE is the primary DPRK government agency that oversees nuclear programs, including the operation of the Yongbyon Nuclear Research Center.

Location: Haeudong, Pyongchen District, Pyongyang, DPRK.

A.K.A.: General Department of Atomic Energy (GDAE)

8. KOREAN TANGUN TRADING CORPORATION

Description: Korea Tangun Trading Corporation is subordinate to DPRK's Second Academy of Natural Sciences and is primarily responsible for the procurement of commodities and technologies to support DPRK's defense research and development programs, including, but not limited to, WMD and delivery system programs and procurement, including materials that are controlled or prohibited under relevant multilateral control regimes.

Location: Pyongyang, DPRK.

9. AMROGGANG DEVELOPMENT BANKING CORPORATION

Description: Amroggang, which was established in 2006, is a Tanchon Commercial Bank-related company managed by Tanchon officials. Tanchon plays a role in financing KOMID's sales of ballistic missiles and has also been involved in ballistic missile transactions from KOMID to Iran's Shahid Hemmat Industrial Group (SHIG). Tanchon Commercial Bank was designated by the Committee in April 2009 and is the main DPRK financial entity for sales of conventional arms, ballistic missiles, and goods related to the assembly and manufacture of such weapons. KOMID was designated by the Committee in April 2009 and is the DPRK's primary arms dealer and main exporter of goods and equipment related to ballistic missiles and conventional weapons. The Security Council designated SHIG in resolution 1737 (2006) as an entity involved in Iran's ballistic missile programme.

Location: Tongan-dong, Pyongyang, DPRK

A.K.A.: AMROGGANG Development Bank; Amnokkang Development Bank

pelo Comité em Abril de 2009) e implicada no desenvolvimento de armas de destruição maciça.

Localização: Rakwon-dong, Distrito de Pothonggang, Pyongyang, RPDC.

Também conhecida por: KOREA HYOKSIN EXPORT AND IMPORT CORPORATION

7. SECRETARIADO-GERAL DA ENERGIA ATÓMICA (GBAE, GENERAL BUREAU OF ATOMIC ENERGY)

Descrição: O GBAE é responsável pelo programa nuclear da RPDC, que inclui o Centro de Investigação Nuclear de Yongbyon e o seu reactor de investigação de produção de plutónio, com uma potência de 5 MWe (25 MWt), bem como as suas unidades de fabrico de combustível e de reprocessamento. O GBAE participou em reuniões e debates sobre questões nucleares com a Agência Internacional da Energia Atómica. O GBAE é o principal organismo público da RPDC que superintende os programas nucleares, incluindo o funcionamento do Centro de Investigação Nuclear de Yongbyon.

Localização: Haeudong, Distrito de Pyongchen, Pyongyang, RPDC.

Também conhecido por: Departamento Geral da Energia Atómica (GDAE, General Department of Atomic Energy)

8. KOREAN TANGUN TRADING CORPORATION

Descrição: A Korea Tangun Trading Corporation está dependente da Segunda Academia de Ciências Naturais da RPDC e é a principal responsável pela aquisição de bens e tecnologias de apoio aos programas de investigação e desenvolvimento da RPDC no sector da defesa, incluindo, entre outros, programas e aquisições de armas de destruição maciça e respectivos vectores, nomeadamente materiais proibidos ou controlados no quadro dos regimes multilaterais de controlo pertinentes.

Localização: Pyongyang, RPDC.

9. AMROGGANG DEVELOPMENT BANKING CORPORATION

Descrição: A Amroggang, criada em 2006, é uma empresa ligada com o Tanchon Commercial Bank e gerida por funcionários do Tanchon. O Tanchon desempenha um importante papel no financiamento da venda de mísseis balísticos da KOMID tendo estado também envolvido em transacções de mísseis balísticos entre a KOMID e o Shahid Hemmat Industrial Group do Irão (SHIG). O Tanchon Commercial Bank foi designado pelo Comité em Abril de 2009 e é a principal entidade financeira da RPDC para a venda de armas convencionais, mísseis balísticos e bens relacionados com a montagem e fabrico dessas armas. A KOMID foi designada pelo Comité em Abril de 2009 e é a principal negociante de armas e o principal exportador de bens e equipamentos relacionados com mísseis balísticos e armas convencionais. O Conselho de Segurança designou o SHIG, na sua Resolução n.º 1737 (2006), como uma entidade envolvida no programa de mísseis balísticos do Irão.

Localização: Tongan-dong, Pyongyang, RPDC

Também conhecida por: AMROGGANG Development Bank; Amnokkang Development Bank

10. GREEN PINE ASSOCIATED CORPORATION

Descrição: Green Pine Associated Corporation (“Green Pine”) has taken over many of the activities of the Korea Mining Development Trading Corporation (KOMID). KOMID was designated by the Committee in April 2009 and is the DPRK’s primary arms dealer and main exporter of goods and equipment related to ballistic missiles and conventional weapons.

Green Pine is also responsible for approximately half of the arms and related materiel exported by the DPRK.

Green Pine has been identified for sanctions for exporting arms or related material from North Korea. Green Pine specializes in the production of maritime military craft and armaments, such as submarines, military boats and missile systems, and has exported torpedoes and technical assistance to Iranian defence-related firms.

Location: c/o Reconnaissance General Bureau Headquarters, Hyongjesan-Guyok, Pyongyang, North Korea; Nungrado, Pyongyang, DPRK

A.K.A.: CHO’NGSONG UNITED TRADING COMPANY; CHONGSONG YONHAP; CH’O’NGSONG YO’NHAP; CHOSUN CHAWO’N KAEBAL T’UJA HOESA; JINDALLAE; KU’MHAERYONG COMPANY LTD; NATURAL RESOURCES DEVELOPMENT AND INVESTMENT CORPORATION; SAEINGP’IL COMPANY

11. KOREA HEUNGJIN TRADING COMPANY

Descrição: The Korea Heungjin Trading Company is used by KOMID for trading purposes. We suspect it has been involved in supplying missile-related goods to Iran’s Shahid Hemmat Industrial Group (SHIG). Heungjin has been associated with KOMID, and, more specifically, KOMID’s procurement office. Heungjin has been used to procure an advanced digital controller with applications in missile design. KOMID was designated by the Committee in April 2009 and is the DPRK’s primary arms dealer and main exporter of goods and equipment related to ballistic missiles and conventional weapons. The Security Council designated SHIG in resolution 1737 (2006) as an entity involved in Iran’s ballistic missile programme.

Location: Pyongyang, DPRK

A.K.A.: Hunjin TRADING Co., Korea Henjin Trading Co., Korea Hengjin Trading Company

B) Goods

The Committee determined that these items shall be specified for the purpose of paragraph 8(a)(ii) of resolution 1718 (2006):

- 1) “Graphite designed or specified for use in Electrical Discharge Machining (EDM) machines”
- 2) “Para-aramid fiber (Kevlar and other Kevlar-like), filament and tape”

10. GREEN PINE ASSOCIATED CORPORATION

Descrição: A Green Pine Associated Corporation (“Green Pine”) assumiu muitas das actividades da Korea Mining Development Trading Corporation (KOMID). A KOMID foi designada pelo Comité em Abril de 2009 e é a principal negociante de armas e o principal exportador de bens e equipamentos relacionados com mísseis balísticos e armas convencionais.

A Green Pine é também responsável por aproximadamente metade do armamento e material conexo exportado pela RPDC.

A Green Pine foi identificada devido a sanções por exportação de armamento ou material conexo da Coreia do Norte. A Green Pine é especializada na produção de equipamento e armamento militar marítimo, tal como submarinos, embarcações militares e sistemas de mísseis, tendo exportado torpedos e assistência técnica a empresas iranianas do sector da defesa.

Localização: a/c Reconnaissance General Bureau Headquarters, Hyongjesan-Guyok, Pyongyang, North Korea; Nungrado, Pyongyang, RPDC

Também conhecida por: CHO’NGSONG UNITED TRADING COMPANY; CHONGSONG YONHAP; CH’O’NGSONG YO’NHAP; CHOSUN CHAWO’N KAEBAL T’UJA HOESA; JINDALLAE; KU’MHAERYONG COMPANY LTD; NATURAL RESOURCES DEVELOPMENT AND INVESTMENT CORPORATION; SAEINGP’IL COMPANY

11. KOREA HEUNGJIN TRADING COMPANY

Descrição: A Korea Heungjin Trading Company é utilizada pela KOMID para fins comerciais. Suspeita-se ter estado implicada no fornecimento de bens relacionados com mísseis ao Iran’s Shahid Hemmat Industrial Group (SHIG). A Heungjin está associada à KOMID, e, mais precisamente, ao serviço de contratos públicos da KOMID. A Heungjin tem sido utilizada para fins da obtenção de um controlador digital avançado com aplicações na concepção de mísseis. A KOMID foi designada pelo Comité em Abril de 2009 e é a principal negociante de armas e o principal exportador de bens e equipamentos relacionados com mísseis balísticos e armas convencionais. O Conselho de Segurança designou o SHIG, na sua Resolução n.º 1737 (2006), como uma entidade envolvida no programa de mísseis balísticos do Irão.

Localização: Pyongyang, RPDC

Também conhecida por: Hunjin TRADING Co., Korea Henjin Trading Co., Korea Hengjin Trading Company

B) Bens

O Comité determinou que, para efeitos da sublínea ii) da alínea a) do n.º 8 da Resolução n.º 1718 (2006), devem ser indicados os seguintes artigos:

- 1) «Grafite concebida ou destinada para ser utilizada em máquinas de electroerosão (EDM)»
- 2) «Materiais fibrosos ou filamentosos e bandas de para-aramida (Kevlar e de tipo Kevlar)»

C) Individuals

The Committee designates the following individuals to be subject to the provisions of the measures imposed in paragraphs 8(d) and 8(e) of resolution 1718 (2006):

1. **Yun Ho-jin:** Director of Namchongang Trading Corporation; oversees the import of items needed for the uranium enrichment program. (Additional information: born 13 October 1944; also known as Yun Ho-chin)

2. **Ri Je-son:** Director of the General Bureau of Atomic Energy (GBAE), chief agency directing DPRK's nuclear program; facilitates several nuclear endeavors including GBAE's management of Yongbyon Nuclear Research Center and Namchongang Trading Corporation. (Additional information: born 1938; also known as Ri Che-son)

3. **Hwang Sok-hwa:** Director in the General Bureau of Atomic Energy (GBAE); involved in DPRK's nuclear program; as Chief of the Scientific Guidance Bureau in the GBAE, served on the Science Committee inside the Joint Institute for Nuclear Research.

4. **Ri Hong-sop:** Former director, Yongbyon Nuclear Research Center, oversaw three core facilities that assist in the production of weaponsgrade plutonium: the Fuel Fabrication Facility, the Nuclear Reactor, and the Reprocessing Plant. (Additional information: born 1940)

5. **Han Yu-ro:** Director of Korea Ryongaksan General Trading Corporation; involved in DPRK's ballistic missile program.

C) Pessoas singulares

O Comité designa as seguintes pessoas singulares a serem sujeitas às disposições das medidas impostas nas alíneas d) e e) do n.º 8 da Resolução n.º 1718 (2006):

1. **Yun Ho-jin:** Director da Namchongang Trading Corporation; responsável pela importação de bens necessários ao programa de enriquecimento de urânio. (Informações suplementares: nascido em 13 de Outubro de 1944; também conhecido por Yun Ho-chin)

2. **Ri Je-son:** Director do Secretariado-Geral da Energia Atómica (GBAE), principal organismo responsável pelo programa nuclear da RPDC; promove várias iniciativas nucleares, incluindo a gestão pelo GBAE do Centro de Investigação Nuclear de Yongbyon e da Namchongang Trading Corporation. (Informações suplementares: nascido em 1938; também conhecido por Ri Che-son)

3. **Hwang Sok-hwa:** Director do Secretariado-Geral da Energia Atómica (GBAE); participação no programa nuclear da RPDC; enquanto Chefe do Departamento Científico do GBAE, fez parte do Comité Científico no âmbito do Instituto Conjunto da Investigação Nuclear.

4. **Ri Hong-sop:** Antigo Director do Centro de Investigação Nuclear de Yongbyon, foi responsável por três instalações de base que contribuem para a produção de plutónio de qualidade militar: a Unidade de Fabrico de Combustível, o Reactor Nuclear e a Unidade de Reprocessamento. (Informações suplementares: nascido em 1940)

5. **Han Yu-ro:** Director da Korea Ryongaksan General Trading Corporation; participação no programa de mísseis balísticos da RPDC.

批示摘錄

透過行政長官二零一二年八月十三日批示：

根據現行《行政長官及司長辦公室通則》第十八條第一款、第二款、第四款及第十九條第五款的規定，李雁玲擔任行政長官辦公室顧問之定期委任，自二零一二年十一月一日起續期至二零一四年十二月十九日。

二零一二年九月六日於行政長官辦公室

辦公室代主任 柯嵐

Extracto de despacho

Por despacho de S. Ex.^a o Chefe do Executivo, de 13 de Agosto de 2012:

Lei Ngan Leng, assessora, deste Gabinete — renovada a comissão de serviço, nos termos dos artigos 18.º, n.ºs 1, 2 e 4, e 19.º, n.º 5, do Estatuto do Gabinete do Chefe do Executivo e dos Secretários, em vigor, de 1 de Novembro de 2012 a 19 de Dezembro de 2014.

Gabinete do Chefe do Executivo, aos 6 de Setembro de 2012. — A Chefe do Gabinete, substituta, *O Lam*.

政府總部輔助部門**批示摘錄**

透過簽署人二零一二年八月三十日批示：

根據現行《澳門公共行政工作人員通則》第四十五條的規定，政府總部輔助部門編制內確定委任第三職階特級公關督導

SERVIÇOS DE APOIO DA SEDE DO GOVERNO**Extractos de despachos**

Por despachos da signatária, de 30 de Agosto de 2012:

Pun Weng U, assistente de relações públicas especialista, 3.º escalão, de nomeação definitiva, do quadro dos SASG — exonerada, a seu pedido, do referido cargo, a partir da data