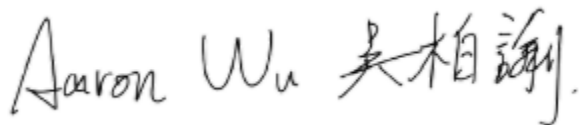NCKU ISP
Institute of Space Propulsion

AEAS逆熵航太
ISP GUIDELINE

APPROVED BY

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APPROVED BY

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TABLE OF CONTENT

1. PURPOSE

The purpose of this document is to provide NCKU Institute of Space Propulsion (成大太空推進研究社) a general guideline to enhance their development.

2. SCOPE

The definitions, rules, and suggestions given in this document are applicable to all documents that are either part of the AEAS configuration baseline or closely related to the baseline. AEAS hereby waives the copyright for this document for ISP. ISP members are allowed to check, copy, paste, and use this document as their supportive documentations.

3. ISP GENERAL GUIDANCE

3.1 ISP CODE OF CONDUCT

無論您是以任何身分參加 ISP 舉辦之活動、線上線下頻道、討論與會議，我們都希望您遵守以下的行為準則：
- 請尊重所有參與者。
- 避免使用帶有侮辱、歧視、或具有潛在**騷擾**意涵的文字、言語及肢體動作。
- 多關心周遭的社群夥伴，適度詢問對方是否需要協助。
- 當遭遇危險、或發現事情不對勁時，適時尋求工作人員的支援與協助。
- 在活動裡多交朋友，珍惜彼此相聚的時光！

騷擾包括有關性別，性別認同、年齡、性向、殘疾、外貌、體型、種族、宗教的攻擊性言語，或是在公共場合散播色情圖片、蓄意恐嚇、跟踪、騷擾性的攝影或錄影、多次打斷活動、不恰當的身體接觸，和讓人感到不舒服的性關注。

請善意推斷其他社群成員也願意共同營造彼此尊重的社群，且樂於接受指教。若您覺得受到冒犯，或見到某種不尊重他人的行為，我們鼓勵您向對方明確指出這樣的感受，並勸告對方停手。
如果您被他人提醒自己的行為有不當之處（或者您自己發現了），還請記得停止不當行為，並向對方鄭重道歉。大家都會犯錯，有時即使無心也可能不慎傷人。只要能重新檢視行為並避免下次再錯，我們就能有更好的社群。

以下的行為是不被容忍的：
- 歧視行為，包含針對性別、性向、種族、外貌、宗教、年齡、身體狀況或個人身分的挑釁、冒犯、錯稱或差別待遇。
- 騷擾行為，包含性騷擾、造成當事人反感的綽號或肢體接觸，以及任何形式的言語或肢體霸凌。
- 公開發表、展示或放映含有侮辱、歧視、仇恨、暴力、或是性暗示的言論或影像。
- 無故干擾活動的正常進行，無視工作人員或與會者的制止。
- 干擾、攻擊活動場地網路，未經同意蒐集或散佈個人資料。
- 其他違反法律的行為。

3.2 AEAS SPIRITS

3.2.1 AEAS 誓詞

我們團結一心, 重視團隊合作與協作, 共同提升我們的集體實力。

我們堅持誠信、透明和負責, 以鞏固組織內部的信任。

我們追求創意與卓越, 全力以赴, 不斷追求改進和創新。

我們尊崇多樣性, 確保每個人的聲音和觀點均得到包容與尊重。

我們以客戶為優先, 通過高品質的產品與服務超越客戶的期望。

我們踐行貫徹職責的匠人精神, 持續發展並對社群產生正面影響。

我們鼓勵持續學習, 培育一個充滿好奇心與知識分享的文化氛圍。

我們啟發領導力, 賦能於各層面的個體, 使其能作出具有影響力的決策。

我們欣賞競爭, 認識到其推動進步和卓越的力量。

我們擁抱挑戰, 視之為成長與進化的機會。

我們表達感激, 慶祝成就並對每個人的貢獻予以肯定。

We unite, valuing teamwork and collaboration, enhancing our collective strength.

We uphold honesty, transparency, and accountability, fostering trust within our organization.

We pursue creativity and excellence, striving for continuous improvement and innovation.

We honor diversity, ensuring inclusivity and respect for every individual's voice and perspective.

We prioritize customers, exceeding expectations through high-quality products and services.

We practice responsible stewardship, promoting sustainability and positive community impact.

We encourage continuous learning, fostering a culture of curiosity and knowledge sharing.

We inspire leadership, empowering individuals to make impactful decisions at all levels.

We admire competitions, recognizing their power to drive progress and excellence.

We embrace challenges, seeing them as opportunities to grow and evolve.

We express gratitude, celebrating achievements and recognizing everyone's contribution

"Ad Astra, Per Aspera"

3.2.2 學術誠信 ACADEMIC INTEGRITY

As a member of the academic community at AEAS, I acknowledge and affirm my commitment to upholding the highest standards of academic integrity. I understand the importance of honesty, fairness, and trustworthiness in all academic endeavors. By enrolling in this institution, I pledge to adhere to the principles outlined in this Academic Integrity Agreement and to act with integrity and responsibility in all my academic pursuits.

I. Plagiarism:

I understand that plagiarism, the act of using someone else's words, ideas, or work without proper acknowledgment, is a serious violation of academic integrity. I will properly cite all sources used in my academic work, including quotations, paraphrases, and summaries, following the citation style guidelines provided by my instructors.

II. Cheating:

I will not engage in any form of cheating, including but not limited to using unauthorized materials during exams, copying from another student's work, collaborating with others without permission, or obtaining and using unauthorized answer keys or solutions.

III. Fabrication:

I will not fabricate or falsify any information, data, or citation in my academic assignments, research projects, or any other academic activities. I understand that presenting false information undermines the integrity of the academic community.

IV. Collaboration:

I will follow the guidelines provided by my instructors regarding collaboration on assignments, group projects, and other academic activities. I will not collaborate with others in ways that violate the academic integrity policies of the institution.

V. Ethical Research Conduct:

If I am involved in research activities, I will conduct my research with honesty and integrity, following ethical guidelines and respecting the rights and dignity of all participants. I will report any research misconduct or ethical concerns to the appropriate authorities.

VI. Multiple Submissions:

I will not submit the same work for multiple assignments without the explicit consent of all instructors involved. Each assignment I submit will be original and specifically prepared for the respective course or academic activity.

VII. Consequences of Violations:

I understand that violations of academic integrity may result in disciplinary actions, including but not limited to failing grades on assignments or exams, course failure, academic probation, suspension, or expulsion from the institution. Additionally, violations may be reported on my academic record.

VIII. Reporting Violations:

I will report any suspected violations of academic integrity that I witness to the appropriate faculty members, administrators, or academic integrity committees. I understand that reporting violations is essential to maintaining the integrity of the academic community.

3.2.3 專業誠信 PROFESSIONAL INTEGRITY

I.   Provide Services:

Assist you with your job and internship search, career development, and career decision-making activities.

II.   Career Information:

Provide access to a range of career opportunities, industry information, and employers looking for engineering talent.

III.   Non-Discrimination:

Provide access and reasonable accommodations to students and prospective employers without regard to race, color, national origin, religion, age, gender, sexual orientation, or disability.

IV.   Protect Confidentiality:

Abide by the [Family Rights and Privacy Act (FERPA)](#) and exercise sound judgment and fairness in maintaining your confidentiality.

4. HOW TO SUCCEED

4.1 GENERAL TIPS

Here are some tips to maximize the chances of doing well in ISP and your life.

1. **Read the documents**. The absolute minimum required documents are outlined in this document, and also this document itself. Further information is supplied with hyperlink. What makes an engineer outstanding? By being able to create AND read good documents.

2. **Budget your time carefully**. Doing research, writing a reasonable report, and working on the field takes many hours of sometimes hard, and rarely straightforward, work. Estimate at least ~20 hours for a full-length report, 4-6 hours to complete a fabrication shift, and 1-2 hours for a comprehensive discussion with your crew. Do not make this impossible by leaving insufficient time. Do not start any task the day before it is due.

3. **Make the connection** between the lecture/web materials and the ISP work. The tremendous potential of your ISP life for real learning is made by those who realize this connection. It is the job and responsibility of the individual student to make this connection, by applying thought to both components. Remember, you don't learn anything by not getting your hands dirty.

4. **Get help**. Use the office hours, discussion boards, design reviews, and the advisors! The intent of the entire ISP activity is to push you towards independent thinking – but we can help.

5. **Come to the club**. You may think it is possible to get all handouts and complete all tasks without physically coming to the club. However, despite the wonders of the internet, the old-fashioned method of asking questions, writing things down, and listening to explanations still works really well. We also will go over labs, tasks, details, etc.

6. **Try to SOLVE the problem.** Engineering is all about problem-solving. You are here in ISP to learn about how to APPROACH problems and SOLVE problems. If all you can do is rely on others, you should go for TSMC instead of ISP.

4.2 SKILLS THAT ARE HELPFUL

Prior experience is not required, yet cultivating these skills will illuminate your journey:

- **English:** Most of the documents are in English, it's just the most fundamental skill.
- **Coursework:** Maintain your GPA, keep track of your grades, and finish your homework on time. These are the signs of you being a responsible engineer!
- **MATLAB:** Converge your idea from the physical world into a physical model.
- **Computer-Aided Design (CAD):** Visualizing concepts precisely.
- **Finite Element Analysis (FEA):** Understanding structural behavior.
- **Computational Fluid Dynamics (CFD):** Mastering fluid dynamics digitally.
- **3D Printing:** Transforming ideas into prototypes.
- **Machining:** Precision in material shaping.
- **Welding:** Connecting two metals into one.
- **Documenting:** Capturing progress effectively. Documentation skills are one of the key skills to become a great engineer.
- **Question Asking:** Seeking knowledge and insights. A person who never ask any question doesn't understand ANYTHING.

"Embrace these skills, enrich your path."

5. ISPxAEAS

成大太空推進研究團隊*ISP* 是 逆熵航太學會*AEAS* 之下級被指導機關。ISP之學術方向、法律活動、對外活動將全權由AEAS管理與指導。ISP成員享有AEAS逆熵航太學會成員之一切權益，包含但並不限於: 產學合作、費用減免、海外升學專案、專屬合作簽約等

5.1 宣言

根據西元2023年6月19日成大太空推進研究社ISP(下稱ISP)內部會議之幹部討論與決議結論，ISP幹部投票結果過半並同意使逆熵航太學會AEAS正式獲得ISP之指導權，並成為其上級指導機關。

逆熵航太學會AEAS理事會代理人 理事長吳柏諭 特此做出以下聲明:

1. 「逆熵航太學會AEAS」是一非營利性的非公開學術性組織，致力於幫助中華民國的航空與太空產業發展，促進學術與產業間之交流，銜接中華民國與國際間之航太技術發展；達成跨領域、跨校、跨國之產學合作，並提供大學部以上之學子們多樣且多元的實習機會。其成員廣泛分布於台灣、日本、新加坡、舊金山、洛杉磯、波士頓、法國、荷蘭等地。多數成員也正就讀或畢業於國內外知名大學如USC、MIT、UCB、UCLA、UCI、CPP、台灣大學、中央大學、成功大學等校，跨足於財經、法律、心理、衛星、航太、機械、工程科學、電腦科學等頂尖學術領域。

2. 逆熵航太學會AEAS作為ISP之上級指導機關擁有幫助ISP團隊與品牌發展之責任，其內容包括但不限於: 經濟發展、學術發展、行政營運、社群經營、贊助合作、人員培育、提供工作與實習機會、法律權益之維護等。

3. ISP作為逆熵航太學會AEAS之直屬下級組織，有責任對於逆熵航太學會AEAS之指導盡溝通義務，此義務包含聆聽與回應。又ISP社長將視為ISP全體意見之代表，將作為學會高層與ISP之溝通主要窗口。

4. ISP將保留其社團自治能力，在不違背學會最高宗旨及其利益之條件下，學會僅能對ISP進行行政職權的分配上提出建議而不得進行強行干預。

5. 因無法強迫ISP所有社員成為AEAS之會員，逆熵航太學會AEAS與其旗下所有品牌包括「ISP學術比賽團隊」將不得開放給無法認同逆熵航太學會AEAS理念之個別成員直接或間接地參與。

6. ISP正式作為AEAS的下屬組織，ISP的所有個別社員將擁有加入逆熵航太學會AEAS之機會。加入之會員將享有AEAS的一切福利，其內容包括但不限於: AEAS Discord 伺服器之使用、AEAS下轄之活動，常任理事經驗座談會、AEAS海外升學輔導專案、AEAS提供之工作機會、AEAS海外夥伴之參與機會等。同時，個別成員也需要盡AEAS之會員責任與遵守逆熵航太學會AEAS內部設立之規範與章程。

7. 因ISP定性為逆熵航太學會AEAS之下級指導組織，其社員繳交之社費將直接視為會費，並提供給ISP幹部群做全權直接管理，不經逆熵航太學會AEAS之手。惟報帳時ISP幹部群須向AEAS繳交交易紀錄等以做財務紀錄與審計用。

8. 為保障ISP團隊整體在逆熵航太學會AEAS內部之權益與發言權，逆熵航太學會AEAS理事會將常設一席理事作為ISP對學會高層之直接溝通管道。此職位將指定ISP之時任社長出席成為一名普通理事，其發言權同等於理事會所有成員包括理事、常任理事、理事長，並享有理事會列席之基本權力。

9. 逆熵航太學會AEAS作為一致力於推廣航太工程領域之組織，其組織最高宗旨為發展航太尖端技術。於不觸及中華民國政府以及美國聯邦政府律法之前提下，逆熵航太學會AEAS將盡可能的保障其所有成員之個人與團隊之技術發展空間。惟航太技術常涉大規模殺傷人員與器械之潛在能力，為保證逆熵航太學會AEAS眾成員之學術發展能夠長久並持續地進行，故對外公開發表之資訊皆須經過逆熵航太學會AEAS理事會或其代理人之許可。

10. 逆熵航太學會AEAS信任、支持、並認可ISP直選出來的社長作為ISP團隊之代表。若發生如ISP內部成員不尊重ISP社長或ISP團隊組織結構而影響團隊發展之重大事由，逆熵航太學會AEAS理事會將支持ISP社長行使其於ISP內部之行政裁決權。

11. ISP在從事任何學術活動時有義務與責任服從指導者或監督者之任何指示。若該活動設有技術指導，則技術指導將視為最高負責人，若無技術指導，則將視國立成功大學航太系吳志勇副教授為監督者。

12. 在從事特定的學術活動，如大型學術比賽等，其團隊成員需以個別自然人的形式與逆熵航太學會AEAS理事會或其代理人簽訂書面契約以明確法律權責歸屬問題。

13. ISP在涉及使用ISP、逆熵航太學會AEAS或AEAS旗下品牌方名義之任何活動都需向理事會報告並取得理事會或其代理人之許可。

14. 如有發生違背逆熵航太學會AEAS內部規章或ISP規章之事宜，將視情況先於以溝通調解。若遇情節重大者，如違背了規章並致使意外之發生與人員傷亡等事件，逆熵航太學會AEAS理事會或其代理人將於溝通調解並釐清事件細節後向ISP行政團隊確認，個別成員有責任為自己的疏失而承擔全責，而ISP社長、該項目負責人、該項目監督者也有責任為自己任內之疏失而承擔相應責任。

15. 逆熵航太學會AEAS理事會在必要時刻保留通過全體過半票決之形式直接撤換ISP領導者之決策權，並得另行指定其接班者。

16. 逆熵航太學會AEAS理事會或其代理人保留開除違反規章者之最終權力，如遇情節重大者，會採取必要之法律途徑以保障其他會員之權益。

5.2 ISP ADVISORS AND ALUMNIS

ISP有三類顧問，第一類為吳志勇博士擔任的，在國立成功大學體制內所定義的「指導社師」，其職責包括：

1. 簽署面對校方之文件
2. 與校方進行溝通與協調
3. 進行TRR與FRR的最高權限核可者

第二類顧問為仲其宇擔任的技術指導人，一個團隊應只有最多一位「技術指導者」，其職責包括：

1. 向團隊提供學術、技術層面上的建議
2. 可進行所有除了TRR與FRR之外的Quality Control並下達APPROVE/DENY之決議
3. 引導團隊完成團隊目標/協助團隊進行比賽

第三類顧問為過去畢業之校友，曾為ISP服務過之成員與前成員，他們並無特定職責，但仍能為ISP提供經驗分享

5.3 文件規範

文件規範的設置意義在於幫助ISP成員以更有效率與更專業的方式去進行文件之撰寫、歸檔，無論是對產學合作、學術論文發表、知識傳播、專業溝通等各方面皆有幫助。

5.3.1 撰寫

所有 ISP之內部文件，包括但不限於：Engineering Specification, Quality Control, R&D Report都應參考AEAS DOCUMENTATION HANDBOOK 。

All documents should be easily accessible and properly stored.
GoogleDrive:
- 行政管理文件(i.e. 會議記錄, Google form)
- Engineering specification
- Engineering research report
- Engineering proposal

Github:
- CAD file
- Ansys file
- Matlab code (.M) file

Other types of platform are **allowed** but not suggested because documentation maintenance will be hard. *Wisely using google sheet to track and monitor all documentations is the key to manage all the documents with EDMS.*

5.3.2 文件存取等級

AEAS逆熵航太學會之文件存取規範適用於ISP文件存取規範，文件存取等級規範的意義在於幫助管理者有效管理與遏止洩漏未定型決策、智慧財產及公共安全規範。細節與AEAS對照表如下：

等級	AEAS	ISP內部
TS - Top Secret	常任理事、理事、秘書	ISP社長一人 及 AEAS理事會
SC - Secret	AEAS幹部及其直屬上級	ISP幹部及其直屬上級
RS - Restricted	AEAS各學術團隊成員及其直屬上級	ISP普通成員及其直屬上級
GN - General	AEAS普通成員	ISP普通成員
PB - Publication	大眾	大眾

Table 1: AEASxISP文件存取等級對照表

5.3.3 開發週期

ISP之任何工程開發皆應參照Code 5.3.3開發週期模式。
Quality Assurance與Quality Control之方法應參考Code 6.2與Code 6.3
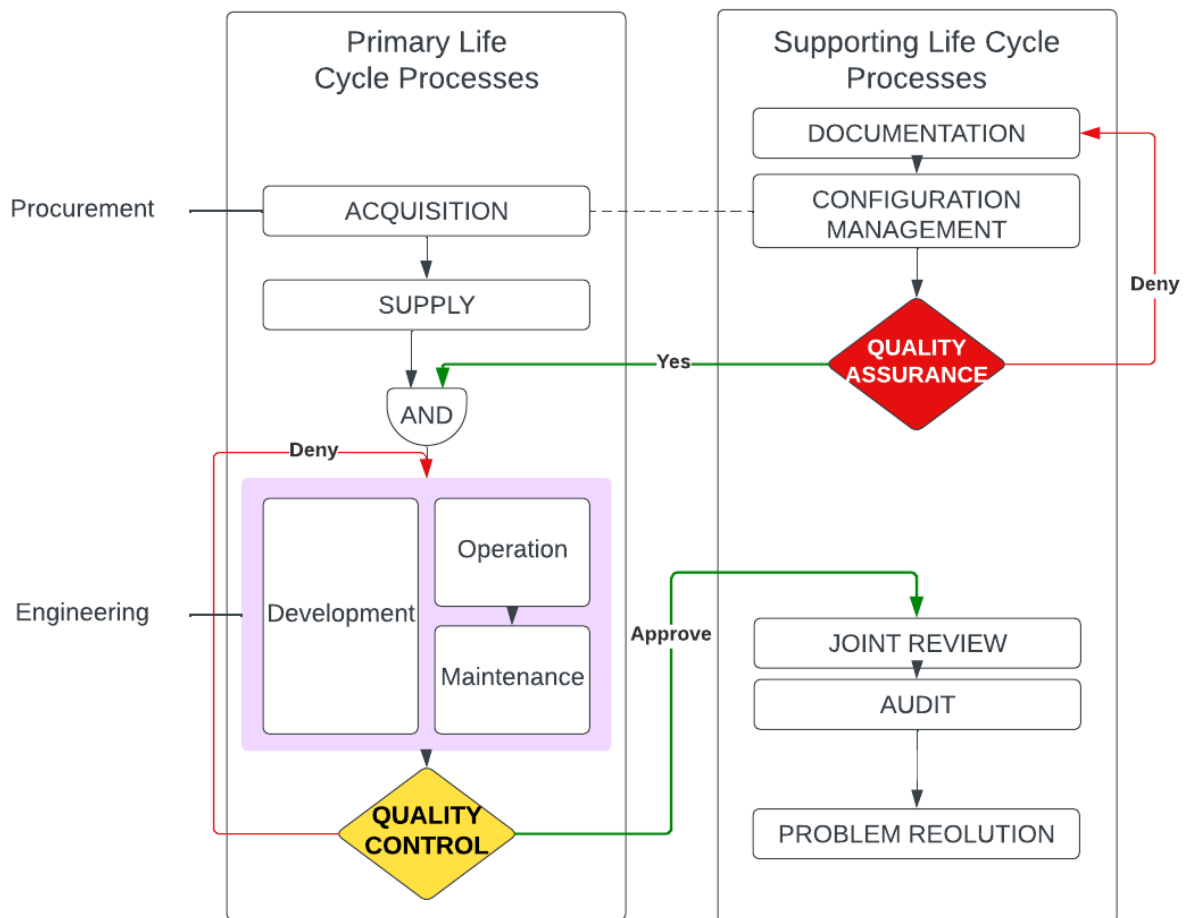
Figure 1: ISP Documents in ISO11207 Processes

Note that specific quality assurance requires designated authorities to approve.

授權項目	QC許可職權
飛行測試, FRR	社師
高功率推力測試(H Class or above), TRR	社師
全系統整合	技術指導
次系統整合	總工程師 (隊長)
次系統開發/製造/組裝	組長
教育	社長

Table 2: Quality Assurance Permissions

5.4 組織結構
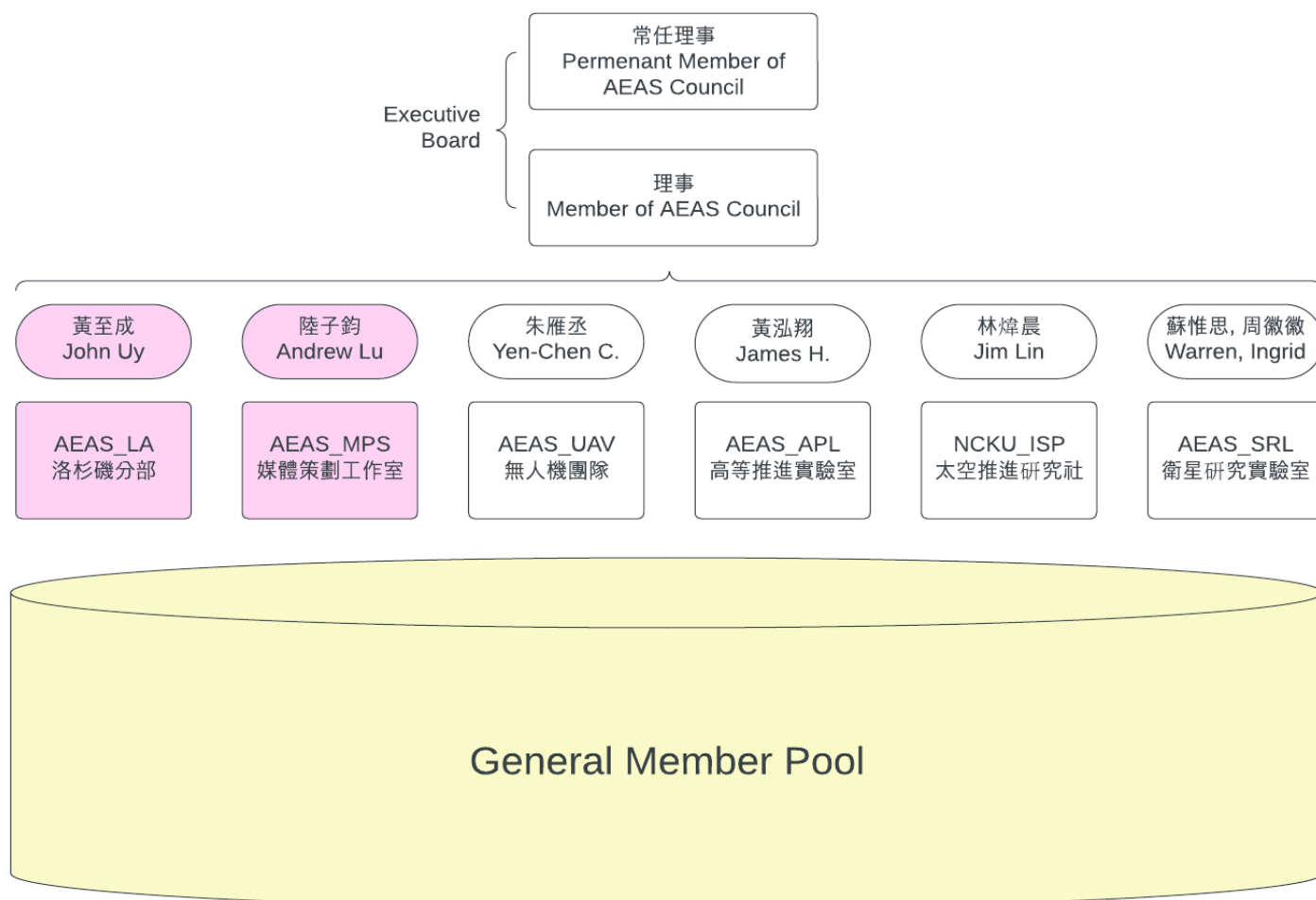
5.5 CONTRACTING

如有自AEAS管道獲得之合約包括但不限於: 與AEAS直接簽訂之合約、AEAS承包之合約、AEAS分派之合約等。任何來自AEAS, 需要提供給ISP之合約都須經ISP內部同意並簽屬相關協議方得進行。

ISP在簽訂合約後應負起相應責任, 合約內容也將同樣應用於ISP之參與人員中, 其透過正式管道對外聯繫時應保持相應禮節與專業性。可能的合約相關行政內容包括但不限於:

- NDA的簽訂

- MOU的簽訂

- 階段性經費發放

- 合約完成之獎金

- 特別貢獻人員Bonus

- 違約金的支付

- 合約條件的完成

- 合約條件未完成之賠償

- 人員職務之調整

5.6 AEAS會員權益

ISP之幹部級 [O-IV] 以上皆須要成為AEAS之正式會員, 履行AEAS會員之職責與享有AEAS會員之權益, 詳情可參考: 🅦 AEAS 會員權限辦法.docx

ISP 職級	AEAS 職級
顧問/指導	R-VIII
社長	L-VII
副社長、組長	O-VI
副組長	O-V
核心成員	O-IV
組員	C-II , C-III

Table 3: AEASxISP職級對照表

6. MANDATORY DOCUMENTATIONS

Listed below are all the different categories of mandatory documentation required by ISPs to achieve their annual goals. It is **MANDATORY** for ISP to create, document, and maintain the following requested documentation to proceed with any further engineering activity. Lacking any one of them will result in a temporary pause on any of the current engineering projects until the documentation is finished, reviewed, and approved.

Decent documentation should have:
- Clarity
- Simple words
- Constant maintenance and revisions
- Consistency
- Reliability
- Practicalness

6.1 SAFETY PROTOCOLS

The development of the following documents/topics is REQUIRED to be written in one or multiple documents in order to process any further engineering activities. All documents must be approved by the advisor in order to proceed.
They must be **PRINTED** when providing any test that is required for this document.
DO NOT just simply use phone and HackMD to proceed any operation, they are not reliable.

6.1.1 GENERAL RULE

Nobody should be hurt in the work field. The senior engineers have the obligation to ensure that all the personnel on the field are safe.
This includes:
- Wearing proper PPE
- Being able to handle emergency situation at any time
- Dispose of hazardous waste properly
- **Try one's best to ensure nobody gets harmed or is exposed to any potential.**

6.1.2 EMERGENCY SEQUENCE

Different emergency sequences are **required** for different kinds of scenarios including statics testing, flight testing, or manufacturing/fabrication operations.
Statics testing and flight testing should include the designated rosters and specify the duty of those rosters. The green, yellow, and red levels of the alarm system should be applied to those. Any manufacturing and fabrication operations should be supervised by at least one engineering lead on the field. NO ONE SHOULD BE IN THE CLUB OR LAB **ALONE.**

6.1.3 PERSONAL PROTECTIVE EQUIPMENT (PPE)

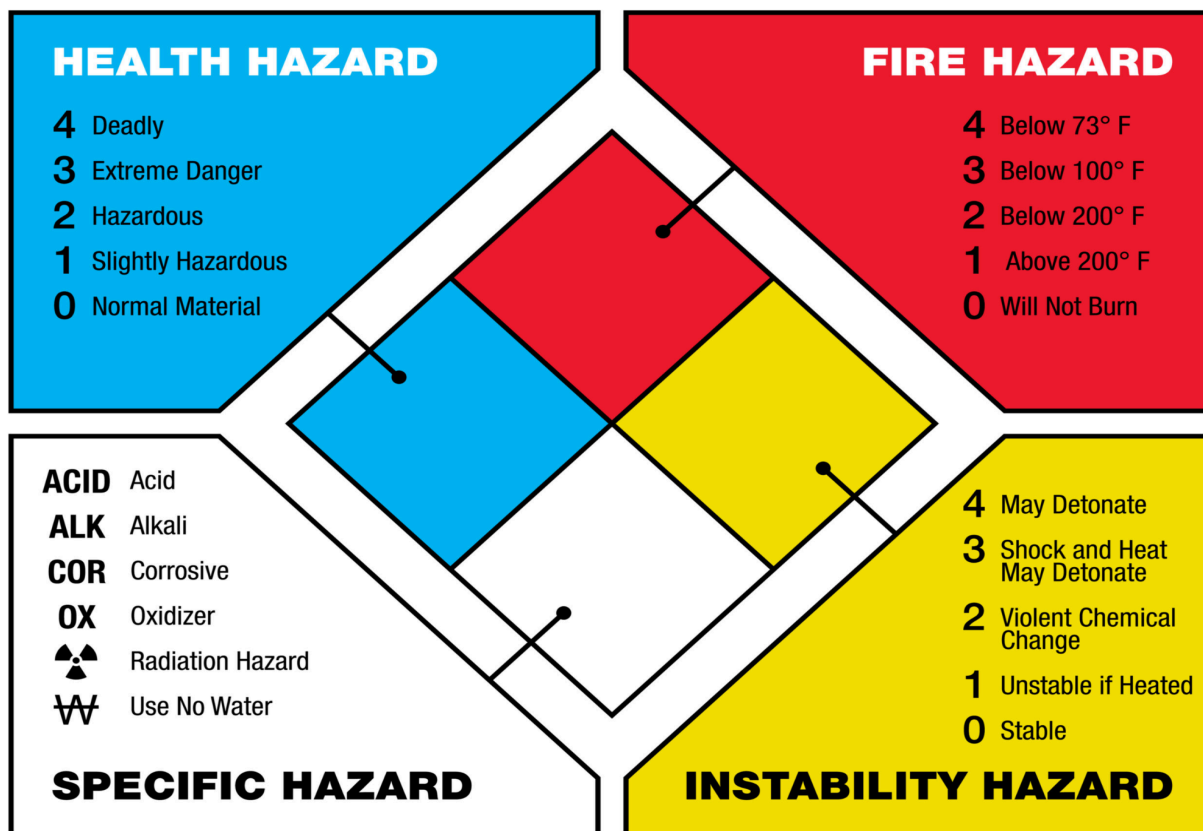PPE requirement sheets for ALL different kinds of operations are required.
This means:

- Safety glasses must be worn at **all time**
- Close-toe shoes, and long pants must be worn at **all times**
- Helmet is suggested
- Hand protection is recommended for processing sharp tools, forbidden to use when operating any power tool.
- Hearing protection is recommended when the working environment is louder than 65 dB.

Any personnel who violate code 6.1.3 should be temporarily expelled from the lab or club. NO EXCEPTIONS.

Head protection
Falling or flying objects, overhead objects

Eye protection
Blowing dust or particles, metal shavings, acids or caustic liquids, welding light

Hearing protection
Loud tools and machinery, poorly maintained equipment

High-visibility hat, vest, pants
Errant vehicles, distracted drivers

Chaps pants
Chainsaws

Hand protection
Sharp or hot objects, chemicals, biological or electrical hazards

Foot protection
Falling or rolling objects, sharp or heavy objects, wet and slippery surfaces, uneven surfaces, hot surfaces, electrical hazards

Harness lanyard
Working more than 6 feet or more above a lower level

6.1.4 HAZARD MATERIAL REGULATIONS

6.1.4.1 CHEMICALS

HEALTH HAZARD
4 Deadly
3 Extreme Danger
2 Hazardous
1 Slightly Hazardous
0 Normal Material

FIRE HAZARD
4 Below 73° F
3 Below 100° F
2 Below 200° F
1 Above 200° F
0 Will Not Burn

SPECIFIC HAZARD
ACID Acid
ALK Alkali
COR Corrosive
OX Oxidizer
☢ Radiation Hazard
W̶ Use No Water

INSTABILITY HAZARD
4 May Detonate
3 Shock and Heat May Detonate
2 Violent Chemical Change
1 Unstable if Heated
0 Stable

Apply NFPA Diamond to label the chemical in use. *NFPA 704 must be applied.*

Chemical Waste includes:

Liquid
- Aqueous solutions containing toxic metals
- Concentrated acidic or alkaline solutions (place in thick glass or plastic containers)
- Mercury
- Silver salts
- Used vacuum pump oil

Gross Solid
- Silica and alumina gels

Solid
- Contaminated PPE (Used gloves, masks)
- Kimwipes / Paper towel
- Chemicals no longer needed or wanted may remain in their original containers

Recycle
- Organic solvents

● Halogenated organic solvents

6.1.4.2 COMPOSITES

Most of the composites are toxic and are not allowed for the personnel to have direct touching, inhaling, or any other form of contact.

6.1.4.3 EXPLOSIVES

● **NFPA 495** must be applied to manage all explosive materials.
● ISO W002 Explosive Labels or other types of explosive labels should be put on the surface of the container.

6.1.4.4 PRESSURIZED GAS

● **NFPA 55** must be applied to manage all compressed gases and cryogenic fluids.
● All cylinders should be chained up for the safety concern.
● Pressurized gas labels should be applied on all containers.

6.1.4.5 SHARPS

Things that are sharp should NOT be disposed of in a regular trash bin. Instead, they should be disposed of in a designated sharp bin.

This includes:
● Needles
● Razor blades, scalpels
● Microscope slides
● Glass pipettes
● Dental wires
● Glass Pasteur pipettes
● Blood virals (glass Vacutainer tubes)
● Any contaminated material that can puncture/penetrate the skin or Red Bag.

6.1.4.6 STANDARD PICTOGRAMS

Standard Pictograms reflect the various hazard categories.

Health Hazard

- Carcinogen
- Mutagenicity
- Reproductive Toxicity
- Respiratory Sensitizer
- Target Organ Toxicity
- Aspiration Toxicity

Flame

- Flammables
- Pyrophorics
- Self-Heating
- Emits Flammable Gas
- Self-Reactives
- Organic Peroxides

Exclamation Mark

- Irritant (skin and eye)
- Skin Sensitizer
- Acute Toxicity (harmful)
- Narcotic Effects
- Respiratory Tract Irritant
- Hazardous to Ozone Layer (Non-Mandatory)

Gas Cylinder

- Gases Under Pressure

Corrosion

- Skin Corrosion/ Burns
- Eye Damage
- Corrosive to Metals

Exploding Bomb

- Explosives
- Self-Reactives
- Organic Peroxides

Flame Over Circle

- Oxidizers

Environment
(Non-Mandatory)

- Aquatic Toxicity

Skull and Crossbones

- Acute Toxicity (fatal or toxic)

6.1.5 FABRICATION AND ASSEMBLY

6.1.5.1 POWER TOOLS AND HAND TOOLS

Check **OSHA 1910.241, 1910.242, 1910.243, and 1910.244.**

6.1.5.2 MACHINERY

Machining operations such as lathe, mill, band saw, angle grinder, and welding around people should make a loud call out before operation to protect the personnel around.

"Welding"

6.2 QUALITY ASSURANCE

The following engineering methodology should be taken into consideration and formulated into formal documentation while developing or proceeding with any engineering project.

6.2.1 MDR - Mission Design Review

A Mission Design Review (MDR) is a critical phase in aerospace engineering projects where the proposed mission's design and objectives are rigorously evaluated. Typically conducted before the project moves into the detailed design phase, the MDR assesses the feasibility, technical aspects, and risks associated with the mission. It involves a thorough examination of mission parameters, spacecraft design, trajectory analysis, scientific or operational goals, and safety protocols. The review aims to ensure that the mission's design aligns with project goals, adheres to budget constraints, and can be successfully executed. Successful MDRs are pivotal in advancing aerospace projects to the next stages of development and implementation.

6.2.2 PDR - Preliminary Design Review

PDR (Preliminary Design Review) and CDR (Critical Design Review) are vital milestones in the product development process, particularly in fields like aerospace engineering.

Preliminary Design Review (PDR) is the phase where the initial design concept is evaluated. You can put up your sketch drawing and draft when writing the PDR report. During PDR, the focus is on ensuring that the proposed design meets the project requirements and goals. Engineers present their preliminary designs, including system architecture, specifications, and plans for implementation. Successful PDR indicates that the project can proceed to the detailed design phase with confidence.

6.2.3 CDR - Critical Design Review

Critical Design Review (CDR) is a methodology of quality assurance that takes place after the detailed design work has been completed. It involves a comprehensive evaluation of the detailed design, focusing on the technical aspects, safety, and compliance with requirements. At CDR, the engineering team presents the finalized design, including schematics, analysis results,

and manufacturing plans. The goal is to ensure that the design is mature, well-documented, and ready for production. Approval at CDR means the design is approved for manufacturing, construction, or further development.

6.2.4 TRR - Test Readiness Review

Continuing after CDR, a TRR ensures that the test article (hardware/software), test facility, support personnel, and test procedures are ready for testing and data acquisition, reduction, and control. This is not a prerequisite for Key Decision Point entry.

6.2.4.1 Test Facility

The permission/waiver documentation provided by the test facility MUST be documented in order to proceed with TRR.

6.2.4.2 Support Personnel

The roster must be provided and must not change in order to proceed with TRR.

6.2.4.3 Test Procedure

Standard Operating Procedures (SOP), Safety Protocols, and Emergency Sequences *following code 6.1* must be completed and provided for the TRR

*A TRR should be performed for all participants, professors, and advisors. Approval from the professor is **required** for any further process.*

6.2.4.4 TRR Sequence

TRR is one of the last checkpoints upon performing a static fire. The overall process from passing the TRR to performing the actual testing usually takes 3 weeks. It takes 1 week to arrange a day with the faculty advisor, and another week to arrange a day with the school. The overall process is illustrated below

Process Started	TRR request submission
within 3 days	TRR Request approved by GEMINI Office (date remains TBA)
within 3 days	GEMINI Office arranges a TRR date at a minimum of one week in advance with Faculty Advisor.
within 1 day	Date confirmed. TRR Request announced by GEMINI Office
within 7 days	TRR Performed, QA Approved, submit Test Require Form to Faculty Advisor
within 1 day	Faculty Advisor arranges Hot-fire testing date with the school, signed off Test Require Form
within 3~7 days	Statics Hot-fire

6.2.5 FRR - Flight Readiness Review

The FRR examines tests, demonstrations, analyses, and audits that determine the system's readiness for a safe and successful flight or launch and for subsequent flight operations. It also ensures that all flight and ground hardware, software, personnel, and procedures are operationally ready.

The following are typical objectives of an FRR:

- Receive certification that flight operations can safely proceed with acceptable risk.
- Confirm that the system and support elements are properly configured and ready for launch.
- Establish that all interfaces are compatible and function as expected.
- Establish that the system state supports a launch "go" decision-based on go/no-go criteria.

A FRR should be performed for all participants, professors, and advisors. Approval from the professor is **required** for any further process.

Test Readiness Review (TRR) and Flight Readiness Review (FRR) are **MANDATORY** to be performed as a part of the Safety Protocol. There will be **NOTHING** being **fired** or **flown** without the permission of Dr. 吳志勇. He will ONLY be deciding whether or not to approve a flight test (飛行測試) or a static hot-fire test (推力測試) after a proper readiness review session. **Violation of code 6.1.6 may result in a temporary or permanent ban. Extra consequences from the campus authority such as disciplinary action may also be taken.**

6.3 QUALITY CONTROL

Quality Control (QC) is a systematic process used to ensure that products or services meet specified standards and customer requirements. It involves activities and techniques designed to monitor and verify the consistency and quality of the output during various stages of production or service delivery. QC aims to identify defects, errors, or deviations from the established standards, allowing organizations to make necessary corrections before the final product is delivered to customers.

6.3.1 ENGINEERING DESIGNS

An engineering design for QC should include tolerance, uncertainty, or other quantifiable error margin to be determined.

6.3.1.1 Simulations

Simulations, calculations, and theoretical models should perform the propagation of uncertainty (klima clenta) and rationally quantify the results.

6.3.1.2 CAD, Engineering Drawing

Computer-aided design files and engineering drawings should include proper unit, tolerance, and clearly defined values for critical dimensions.

6.3.2 FABRICATION NOTE

During fabrication, the procedure, measurements, and usage of the material should be recorded within the note.

6.3.3 REVIEW

6.3.2.1 Supervisor reviewing

The supervisor, whose level of authorization is higher than the responsible individual, has the right and responsibility to review and make decisions on their team's work by themselves.

6.3.2.2 Peer reviewing

When there exists no higher authority for the work (need to be approved), peer review is a good choice. When conducting peer review, two peers with the same authorization level need to agree with the same decision or measurements in order to proceed.

6.3.2.3 Results

All results must be documented along with the sign of the personnel who approve it.

6.3.2.4 Failures

All failures must be documented and conduct investigation about the failure.

6.4 TECHNICAL WRITING AND COMMUNICATION

Performing technical writing and communication effectively involves several key steps and best practices. Here's a guide to help you excel in this essential skill:

6.4.1 Understand Your Audience

Identify your target audience. Consider their background, technical expertise, and what they need to know. Tailor your communication style and level of technical detail accordingly.

6.4.2 Clarify Your Purpose

Determine the purpose of your communication. Are you explaining a complex process, describing a technical solution, or providing instructions? Define your goals clearly before you start writing.

6.4.3 Organize Your Content

Structure your document logically. Use headings, subheadings, bullet points, and numbered lists to break down complex information. (Follows ISP GUIDELINE code 5.3.1). A clear and organized structure enhances readability and comprehension.

6.4.4 Use Clear and Concise Language

Avoid jargon and technical terms unless your audience understands them. Use simple, precise language. Be concise and get to the point. Eliminate unnecessary words and sentences.

6.4.5 Visuals and Graphics

Use visuals such as diagrams, charts, and illustrations to supplement your text. Visuals can often convey complex information more effectively than words alone. Ensure all visuals are labeled and referenced properly.

6.4.6 Edit and Proofread

Revise your document multiple times. Check for grammatical errors, spelling mistakes, and formatting issues. Ensure consistency in terminology and style throughout the document. It's often helpful to have someone else review your work as well.

6.4.7 Be Precise and Specific

Provide specific details and examples to clarify your points. Vague or ambiguous language can lead to misunderstandings. Use concrete examples to illustrate technical concepts.

6.4.8 Use Active Voice

Prefer active voice over passive voice. Active voice makes your writing more direct, clear, and engaging. It also emphasizes the action and the doer of the action, which is important in technical writing.

6.4.9 Cite Sources and References

If you're including data, statistics, or quotes from other sources, make sure to cite them properly. This adds credibility to your writing and allows readers to verify the information if needed.

6.4.10 User-Friendly Manuals and Instructions

If you are writing manuals or instructions, consider the end-users. Use step-by-step instructions. Be explicit and anticipate possible questions or problems users might encounter. Include troubleshooting tips.

6.4.11 Be Open to Feedback

Accept feedback graciously. Technical writing often involves collaboration. Constructive criticism helps you improve. Be open to revising your work based on feedback from peers, supervisors, or readers.

6.4.12 Continuous Learning

Stay updated with the latest trends and best practices in technical communication. Read technical documents and manuals to understand different styles and techniques. Join technical writing communities or forums for networking and learning opportunities.

By following these steps and continually refining your technical writing and communication skills, you can create clear, effective, and impactful technical documents that effectively convey complex information to your intended audience.

6.5 ISP MEMBER AGREEMENT

A series of agreement forms must be created for members to sign for ISP to exclude the responsibility of the individual's actions. The agreement form must be approved by the ISP officers with a formal signature on it, otherwise, the agreement form will not be considered as legally valid.

For statics hot fire test and flight test, the agreement MUST be closed and sent to club advisor (吳志勇) at least 2 weeks prior to the actual test. This operation must be completed in order to approve your test request.

One suggestion: can use the Form Builder plugin in the Google Sheet to automatically create these agreement forms whenever there comes a need.

6.5.1 LAB USAGE AGREEMENT

(To be prepared by Dr. 吳志勇)

6.5.2 ISP GENERAL SAFETY AGREEMENT

(To be prepared by President of ISP)

6.5.3 STATICS HOT FIRE TEST AND FLIGHT TEST AGREEMENTS

6.5.3.1 ISP測試免責聲明書 | 文件正本

中文版

<div align="center">

責任免除、風險承擔和賠償協議
本文件影響您的合法權利:簽署前請仔細閱讀！

</div>

火箭實驗涉及許多潛在危險。參加火箭發射的人員將靠近危險化學品、煙火裝置、電氣設備、工具和機械。火箭的建造和測試總是存在火災、爆炸、熱/化學燒傷、碎片撞擊或電擊等風險。與這些活動相關的危險使得測試通常必須在遠端位置進行。這限制了獲得通常在城市範圍內提供的醫療援助的機會。此外,此類援助到達現場所需的時間可能比平時要長得多,或者受傷者可能需要由現場其他人直接運送到最近的醫療機構。參與者還必須意識到,參與這些射擊的其他人的行為可能會對該地區的人造成傷害。從事火箭製造、測試作業、發射和觀測時有受傷或死亡的風險。下列簽署者同意,他們已被告知並了解參與 NCKU ISP 成大太空推進研究社活動所帶來的風險。鑑於您的參與,下方簽署者授予 NCKU ISP 成大太空推進研究社並給予以下全面且完整的權利放棄、責任免除、賠償、風險承擔、無害協議。

家長/學生/個人姓名簽章

_____/_____1. 本人同意承擔在參與火箭活動期間對人或財產造成的一切身體/心理/經濟損害風險。這種風險承擔適用於無論傷害是由於疏忽、未知原因、潛在缺陷或我們無法控制的原因所引起。

_____/_____2. 本人同意在參與火箭活動期間,對於任何第三方對NCKU ISP 成大太空推進研究社提起訴訟、行動或主張,涉及本人所遭受的任何身體/心理/經濟損害,免除NCKU ISP 成大太空推進研究社、其操作人員、成員、官員和代理人的一切法律責任。

_____/_____3. 當事人在此同意放棄依據任何司法管轄區的法規或法律所提供的保護,此豁免的範圍不包括不涉及當事人的索賠,其目的、實質和/或效果不得延伸至此。在執行和發佈時已知或懷疑存在的情況下,此條款生效。

_____/_____4. 本人同意賠償NCKU ISP 成大太空推進研究社、其成員、煙火操作人員、官員和代理人,對於因其參與火箭活動所引起的一切索賠、訴因、損害、判決、費用或支出,包括律師費在內。

_____/_____5. 簽署者同意支付其他參與者財產上的所有損害，無論是由疏忽、故意或非故意行為引起。簽署者充分了解與火箭活動相關的活動被認為是非常危險的，而且所有風險可能事先不可知。此外，簽署者明白將進行涉及推進劑和設備的活動，其性質本身就具有危險性。AEAS逆熵航太的代表已經對我們提出的所有問題給予滿意的答覆。

_____/_____6. 免責聲明：參與者（包括僅僅是觀察者）自由、自願、無壓力地選擇參與，並且簽署本文件，明知自願地承擔所有參與活動的責任。參與者藉此免除、永久釋放，並保證NCKU ISP 成大太空推進研究社及其繼承人和受讓人，免受因參與者在NCKU ISP 成大太空推進研究社的活動中引起或將來可能引起的，無論在法律或公平法上，任何性質的責任、索賠和要求。參與者了解，本協議豁免NCKU ISP 成大太空推進研究社，對於可能由活動引起的任何身體損傷、心理或情感損害、人身傷害、疾病、死亡或財產損害，無論是由NCKU ISP 成大太空推進研究社或其官員、理事、員工或代理人引起，或者其他原因引起的，都不再負責。

_____/_____7. 使用姓名/肖像權：我明白在NCKU ISP 成大太空推進研究社的活動期間，我或未成年人可能會被拍攝、錄像或記錄。在法律允許的最大範圍內，我放棄我對於這些相片或使用我姓名相關的肖像權、隱私權或事先批准的所有權利，並授予NCKU ISP 成大太空推進研究社及其受讓人以任何形式、無限制且任何目的，包括電子方式，對這些相片的版權、使用權和出版權。

_____8.（家長/監護人）為了允許未成年人參加這些活動，我接受並同意本協議的全部內容。我證明我有權代表未成年人簽署本文件並對其相關活動做出決定。我也同意釋放、免除責任、賠償和保護NCKU ISP 成大太空推進研究社，使其免受因未成年人在或與這些活動相關的期間發生的傷害、疾病、死亡、損失或損害所引起的所有責任和索賠。這包括未成年人的任何索賠和由NCKU ISP 成大太空推進研究社的疏忽所引起的任何索賠。

英文版

RELEASE OF LIABILITY, ASSUMPTION OF RISK, AND INDEMNIFICATION AGREEMENT
This document affects your legal rights: Read it carefully before signing!

Rocket experimentation involves many potential hazards. Persons attending rocket firings will be in the proximity of hazardous chemicals, pyrotechnic devices, electrical equipment, tools, and machinery. The building and testing of rockets always present risk of fire, explosion, thermal/chemical burns, fragment impact, or electrical shock, to name a few. The danger associated with these activities is such that testing must often be conducted at a remote location. This limits access to medical assistance that would normally be available within city

limits. In addition, the time required for such assistance to arrive on the scene might be considerably longer than normal, or an injured person might need to be transported to the nearest medical facility directly by others on the scene. Participants must also be aware that the actions of others attending these firings might cause injury to those in the area. Risk of injury or death exists when engaged in rocket fabrication, test operations, launching, and observing. The undersigned agrees that they have been apprised and informed of the risks attendant to participation in NCKU ISP 成大太空推進研究社 activities. In consideration of your participation, the undersigned grants and accords the following full and complete WAIVER OF RIGHTS, RELEASE OF LIABILITY, INDEMNIFICATION, ASSUMPTION OF RISK, HOLD HARMLESS AGREEMENT to the NCKU ISP 成大太空推進研究社.

PARENT/STUDENT/INDIVIDUAL SIGNATURE or STAMP EACH PARAGRAPH

_____/_____1. The undersigned ASSUMES ALL RISKS of physical/emotional/economic injury to person or property while participating in rocket activities. This assumption of risk applies whether such injury results from negligence, unknown causes, latent defects, or causes beyond our control.

_____/_____2. The undersigned agree to HOLD HARMLESS the NCKU ISP 成大太空推進研究社, its pyrotechnic operators, members, officers, and agents in the event that any third party brings suit or action or claims against the NCKU ISP 成大太空推進研究社 in connection with any physical/emotional/economic injury sustained by the undersigned during participation in rocket events.

_____/_____3. The undersigned agrees to WAIVE the protection afforded by any statute or law in any jurisdiction whose purpose, substance, and/or effect is to provide that a general release shall not extend to claims, material or otherwise, which the person giving the release does not know or suspect to exist at the time of executing the release.

_____/_____4. The undersigned agrees to INDEMNIFY the NCKU ISP 成大太空推進研究社, its members, pyrotechnic operators, officers, and agents from any and all claims, causes of action, damages, judgment, costs, or expenses including attorney fees that arise from their participation in rocket activities.

_____/_____5. The undersigned agrees to pay for all damages to the property of other participants whether caused by negligent, intentional, or unintentional actions. The undersigned

fully understands that the activities associated with rocket activities are considered very hazardous and that all of the risks may not be known in advance. Further, the undersigned understands that there will be activities conducted involving propellants and equipment, which, by their nature, are dangerous. The NCKU ISP 成大太空推進研究社 representatives have answered any questions we may have to our satisfaction.

_____/_____6. RELEASE & WAIVER: Participant (including those simply observing) freely, voluntarily, and without duress, elects to participate in spite of the associated risk, and by signing this document, knowingly and voluntarily assumes all responsibility for participation. Participant hereby releases and forever discharges and holds harmless the NCKU ISP 成大太空推進研究社 and its successors and assigns from any and all liability, claims, and demands of whatever kind or nature, either in law or in equity, that arises or may hereafter arise from a participant's activities with the NCKU ISP 成大太空推進研究社. Participant understands this agreement releases NCKU ISP 成大太空推進研究社 from any liability or claim a volunteer may have against NCKU ISP 成大太空推進研究社 with respect to any bodily injury, psychological or emotional injury, personal injury, illness, death, or property damage that may result from activities, whether caused by the NCKU ISP 成大太空推進研究社 or its officers, directors, employees or agents, or otherwise.

_____/_____7. USE OF NAME/ LIKENESS: I understand that during NCKU ISP 成大太空推進研究社 activities I or the minor may be photographed, videotaped, or recorded. To the fullest extent allowed by law, I waive all rights of publicity or privacy or pre-approval that I have for any such likeness of me or use of my name in connection with such likeness, and I grant to NCKU ISP 成大太空推進研究社 and its assigns permission to copyright, use, and publish (including by electronic means) such likeness of me, whether in whole or part, in any form, without restrictions, and for any purpose.

_____8. (PARENT/GUARDIAN) In consideration of a minor being permitted to participate in the activities, I accept and agree to the full contents of this agreement. I certify that I have the authority to sign on behalf of the minor and to make decisions for the minor regarding these activities. I also agree to RELEASE, HOLD HARMLESS, INDEMNIFY AND DEFEND the NCKU ISP 成大太空推進研究社 from all liabilities and claims that arise from injury, illness, death, loss or harm that occurs to the minor during or related to the activities. This includes any claim of the minor and any claim arising from the negligence of the NCKU ISP 成大太空推進研究社.

6.5.3.2 ISP 測試媒體管理協議 TESTING MEDIA AGREEMENT | 文件正本

中文版

日期: ___(MMYYYY ~ MM/YYYY)___
簽署本文件即表示您同意下列有關上述日期範圍內所有 **NCKU ISP 成大太空推進研究社**活動的條款。

_____ 我同意遵守媒體負責人和其他NCKU ISP 成大太空推進研究社領導分享活動照片或分享活動成果的指示。

_____ 我同意在獲得許可之前不會在社交媒體上發布活動的任何照片或結果。

_____ 除緊急情況外，我同意在獲得許可之前，不會向與NCKU ISP 成大太空推進研究社無關的人員傳達發射、靜火或其他主要事件的結果。

_____ 我瞭解並同意，我的肖像畫可能會在本次活動期間被記錄，並可能用NCKU ISP 成大太空推進研究社貼文、宣傳資料、股東大會簡報和相關媒體。

_____ 我不會發布有關本次活動的任何學生或工作人員的任何旨在貶低、羞辱或以故意、有害的方式影響他們的內容。

英文版

Date: ___(MMYYYY ~ MM/YYYY)___
BY SIGNING, You agree to the terms listed below in regards to ALL NCKU ISP 成大太空推進研究社 Events within the Date Range above.

_____ I agree to comply with the instructions of the Media Lead and other NCKU ISP 成大太空推進研究社 leadership regarding sharing photos or sharing results of the Events.

_____ I agree to not post to social media ANY photos or results of the Event until I have permission.

_____ Except in the event of an emergency, I agree to refrain from communicating about the results of the launch, static fire, or other main Event, to personnel unrelated to NCKU ISP 成大太空推進研究社 until I have permission.

_____ I understand and agree that my likeness may be recorded during this Event, and may be used in NCKU ISP 成大太空推進研究社 posts, promotional materials, general meeting slides, and related media.

_____ I will not post anything about any student(s) or personnel of this Event that is meant to demean, humiliate, or affect them in a purposeful, harmful manner.

6.6 EMERGENCY CONTACT FORM

(To be prepared by President of ISP)

6.7 AEAS ROCKET TEST REQUEST | 文件正本

Whenever ISP needs to conduct an either statics hot-fire test or flight test, they MUST fill up the Test Request Form and acquire the signature from the faculty advisor (吳志勇) to proceed the test.

The following items are all mandatory to be submitted to the faculty advisor in order to proceed the test. The faculty advisor has to respond to the test request within a week. And the approval should be acquired at least a month before the planned test.

Check	Item	Approver
	TRR/FRR	
	Standard Operating Procedures	
	Emergency Sequence	
	Safety Protocol	
	Risk Assessment	
	Test Waiver Form	
	Media Agreement Form	
	Emergency Contact Form	
	Test/Launch Permission	