

出國報告 (出國類別：開會)

**2022 美國亞太區域航空安全
雙邊協議國年會出國報告
(2022 FAA/Asia Pacific Bilateral
Partners Dialogue Meeting)**

服務機關：交通部民用航空局

姓名職稱：林副局長俊良

林日新科長

陳玉成技正

派赴國家：首爾，韓國

會議期間：111.11.14-11.18

報告日期：112.01.12

提要表

系統識別號：	C11200112					
視訊辦理：	否					
相關專案：	無					
計畫名稱：	執行推動中美國際雙邊協議會議					
報告名稱：	2022美國亞太區域航空安全雙邊協議國年會出國報告					
計畫主辦機關：	交通部民用航空局					
出國人員：	姓名	服務機關	服務單位	職稱	官職等	E-MAIL 信箱
	林俊良	交通部民用航空局		副局長		
	林日新	交通部民用航空局		科長		
	陳玉成	交通部民用航空局		技正		聯絡人ericchen@mail.caa.gov.tw
前往地區：	韓國					
參訪機關：	韓國民航局					
出國類別：	其他					
實際使用經費：	年度	經費種類	來源機關	金額		
	111年度	其他經費	民航事業作業基金	280,481元		
出國計畫預算：	年度	經費種類	來源機關	金額		
	111年度	其他經費	民航事業作業基金	368,855元		
出國期間：	民國111年11月13日至民國111年11月19日					
報告日期：	民國112年01月18日					
關鍵詞：	雙邊協議，無人機檢驗，先進空中交通（AAM），持續操作安全（COS），單駕駛操作（SPO）					
報告書頁數：	29頁					
報告內容摘要：	<p>本報告說明美國FAA與亞太區域民航主管機關航空安全雙邊協議國對談會議（Asia Pacific Bilateral Partners Dialogue Meeting, APAC），各項工作小組成果彙報及議題研討項目，包括：(一)無人機檢驗工作小組（UCWG），有關遙控無人機檢驗議題。(二)先進空中交通（Advanced Air Mobility, AAM），討論遙控無人機進行載運（乘客或貨物）飛航相關管理機制。(三)遠距監理策略工作小組，討論利用遠距科技進行檢查之作業機制。(四)因應航空產業快速變化的安全管理系統，討論新興產業及製造業導入SMS之議題。(五)FAA持續操作安全（Continued Operational Safety, COS）論壇，討論有關航空器持續適航相關議題。(六)單駕駛操作及超音速飛行，因應數位科技的進步及超音速/超高速航空器開發所衍生的檢定議題。</p>					
報告建議事項：	建議事項			狀態	說明	
	積極參與各項APAC無人機檢驗工作小組（UCWG）會議及各項國際會議，汲取各國驗證制度發展趨勢			已採行		

	<p>與經驗，做為我國無人機相關法規、程序調整修訂之依據。</p> <p>利用我國為APAC AAM工作小組成員之一的機會，持續了解國際間針對此新興類型航空器之檢定考量及檢定方式。</p> <p>了解檢定法規修訂方向及修訂重點內容，掌握最新資訊，做為我國更新修訂「06-07A航空產品與其各項裝備及零組件適航檢定管理規則」之參考。</p> <p>了解各國推動無人機射頻識別以及其產業發展情況，做為我國推動無人機射頻識別的規劃參考。</p>	<p>已採行</p> <p>已採行</p> <p>已採行</p>
電子全文檔：	C11200112_01.pdf	
出國報告審核表：	C11200112_A.pdf	
限閱與否：	否	
專責人員姓名：	莊順淑	
專責人員電話：	02-23496197	

列印 匯出

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壹、目的

美國聯邦航空總署（Federal Aviation Administration, FAA）舉辦 2022 年美國與亞太區域航空安全雙邊協議國年會（Asia Pacific Bilateral Partners Dialogue Meeting, APAC），此為 FAA 每年定期舉辦與簽署 BASA（Bilateral Aviation Safety Agreement）之亞太區域民航主管機關之對談會議，本次會議與韓國民航局（Korea Office of Civil Aviation, KOCA）聯合舉辦，假韓國首爾 The Shilla Hotel 召開，為 COVID-19 疫情後首次實體會議。

本次會談提供 FAA 與其雙邊協議國交換意見、分享重要資訊並解決雙方所關切衝擊亞太區域航空安全議題的機會，本次年會的主題除各工作小組（Working Group, WG）成果彙報與研討外，尚有其他飛航安全相關議題，會中所討論之議題項目包含如下：

- 一、FAA 未來飛安策略規劃與亞太合作：說明 FAA 飛安資訊蒐集精進做法，以及對無人載具及太空產業創新發展因應策略，並積極與亞太各國在航空方面持續合作與支持。
- 二、5G 發展與飛航安全：討論 5G 頻率與航空器雷達高度計干擾之飛航安全議題。
- 三、無人機檢驗工作小組（Unmanned Aircraft Certification Working Group, UCWG）：討論有關遙控無人機檢驗制度議題。
- 四、先進空中交通（Advanced Air Mobility, AAM）：討論大型無人機載運（乘客或貨物）飛航之相關管理機制，韓國並說明 AAM 發展策略與產業現況。
- 五、FAA 持續操作安全論壇（Continued Operational Safety/COS Forum）：討論有關航空器持續適航相關議題。
- 六、遠距監理工作小組（Surveillance Strategies Working Group, SSWG）：討論因疫情導致實地檢查限制而發展出之遠距監理作業機制。
- 七、會議亦就航空製造業推行安全管理系統（SMS），以及未來單駕駛操作（Single Pilot Operation, SPO）相關法規制訂等議題進行研討。
- 八、各國民航局出席代表簡報法規及政策業務近況。

貳、行程

一、 本次行程安排如下：

本次出國行程林俊良計 5 日，林日新及陳玉成計 7 日，行程簡述如下表

日期	人員	行程
111.11.13	林日新及陳玉成	桃園機場-韓國首爾
111.11.14	林日新及陳玉成 林俊良	參加無人機檢驗工作小組（UCWG）會議 桃園機場-韓國首爾
111.11.15~ 111.11.17	林俊良、林日新及 陳玉成	參加航空安全雙邊協議國年會
111.11.18	林日新及陳玉成 林俊良	參加先進空中交通（Advanced Air Mobility, AAM） 工作小組會議 韓國首爾-桃園機場
111.11.19	林日新及陳玉成	韓國首爾-桃園機場

參、會議過程

一、會議參與單位：

本次會議由美國聯邦航空總署航空器檢定部門（Aircraft Certification Service, ACS）新任執行長官（Executive Director）Ms. Lirio Liu 及韓國民航局（Korea Office of Civil Aviation, KOCA）適航部門主管 Mr. Moon Seok Jun 共同主持，韓國國土建設部副部長兼民航局局長（Deputy Minister）Mr. Ha Dong Soo 進行會議開幕致詞，亞太地區主要民航主管機關均出席，包括美國、中國大陸、香港、日本、韓國、澳洲、紐西蘭、新加坡、馬來西亞、印度等 10 個民航主管機關，共有約 30 位代表實地與會。

二、議程摘要：

本次年會日期為 11 月 15 日至 11 月 17 日共 3 天，同時無人機檢驗工作小組（UCWG）於 11 月 14 日(年會之前)，以及先進空中交通（Advanced Air Mobility, AAM）工作小組於 11 月 18 日(年會之後)分別召開工作小組會議，本局由林俊良副局率林日新科長及陳玉成技正參與，林副局長僅參加 2022 年美國與亞太區域航空安全雙邊協議國年會，林日新科長及陳玉成技正全程參加年會以及前後之工作會議。議程依日期順序摘要如後：

無人機檢驗工作小組 (UCWG) 議程 (11月14日)

Agenda	Duration	Time (KST)
Recap and introductions		
Introductions of Members	30 mins	0800-0830
Recap of virtual meetings since 2020	20 mins	0830-0850
Total	50 mins	
Comfort Break		
		0850-0900
BVLOS operations		
Japan policy on BVLOS	30 mins	0900-0930
FAA ARC on BVLOS	30 mins	0930-1000
CAAS BVLOS Approach	30 mins	1000-1030
Total	1 hr 30 mins	
Registration and tracking of UAS in flight		
CAAS Centralised Flight Management System	30 mins	1030-1100
FAA Remote Identification	30 mins	1130-1200
JCAB policy on registration and tracking	30 mins	1200-1230
Total	1 hr 30 mins	
Lunch		
		1230-1330
UAS Type Certification		
CAAC	30 mins	1330-1400
FAA	30 mins	1400-1430
DGCA India	30 mins	1430-1500
Total	1hr 30 mins	
Comfort Break		
		1500-1515
Looking ahead on UCWG		
Airworthiness requirements for cross-border UAS operations	30 mins	1515-1545
Deliverables as committed to in the charter	30 mins	1545-1615
Update to APAC Bilateral Partners Dialogue	30 mins	1615-1645
Future meetings	15 mins	1645-1700
Total	1hr 45 mins	

航空安全雙邊協議國年會 Day 1 (11月15日)

Tuesday 15 November 2022 AUTHORITY DAY – Shilla Hotel, 3 rd Floor (Orchid) Virtual Connection: https://faavideo.zoomgov.com/j/1613302109 • Passcode: 080808		
8:00 – 8:30	Meeting Registration	All participants
8:30 – 9:00	Welcome Remarks	Mr. Ha Dong Soo, Deputy Minister for Office of Civil Aviation, KOCA Ms. Lirio Liu, Executive Director, Aircraft Certification Service, FAA
9:00 – 9:45	Strategic Leadership: A recap of activities led by Asia-Pacific Bilateral Partners <i>Objective: Provide an overview of partnership throughout the region and discuss areas for collaboration as we move ahead</i>	Mr. Chris Carter, Director, Asia-Pacific Office, Office of International Affairs, FAA
9:45 – 10:00	Morning Tea / Networking	
10:00 – 11:30	Technical Presentation: 5G and Spectrum <i>Objective: Outline the response to ensure safety of newly activated wireless spectrum in the United States and lessons learned</i>	Ms. Lirio Liu, Executive Director, Aircraft Certification Service, FAA (Virtual) Mike Linegang, Manager, Operational Safety Branch, FAA
11:30 – 12:30	Lunch	
12:30 – 15:00	Authority Presentations on Regulatory and Policy Initiatives <i>Objective: Authorities present on regulatory or policy initiatives to provide a basis for discussion on potential areas of collaboration</i> <i>If needed, TBC on Day 3...</i>	FAA CAAC CAAM CAAS CASA JCAB KOCA CAANZ CAA Chinese Taipei DGCA - India
15:00 – 15:15	Afternoon Tea / Networking	
15:15 – 16:45	Technical Discussion: Aviation System Resilience <i>Objective: A discussion on positioning the APAC going forward as we continue to recover from the pandemic to prepare for future disruptive events</i>	John Yoo, FAA (facilitator) Alan Foo, Sr. Director Safety Regulation Group, CAAS Jeff Duven, Director, System Oversight Division, FAA Riley Downing, Senior Representative, Southeast Asia, FAA Other authorities
16:45 – 17:00	Day 2 Review and Close	APAC Secretariat

航空安全雙邊協議國年會 Day 2 (11月16日)

Wednesday 16 November 2022 AUTHORITY DAY – Shilla Hotel, 3 rd Floor (Orchid) Virtual Connection: https://faavideo.zoomgov.com/j/1613302109 • Passcode: 080808		
8:00 – 8:15	Day 3 Welcome	Mr. Moon Seok Jun, Director Airworthiness division, KOCA
8:15 – 9:15	COS Forum Working Group 8:15 – 9:00 Update 9:00 – 9:15 Q&A	(Virtual) COS Forum Lead Mr. Chris Spinney, FAA
9:15 – 10:15	Surveillance Strategies Working Group (SSWG) 9:15 – 10:00 Update 10:00 – 10:15 Q&A	(Virtual) SSWG Co-Leads Ms. Susan Kerekes, FAA and Mr. Kenji Miyabe, JCAB
10:15 – 10:30	Comfort Break	
10:30 – 11:30	Technical Presentation: Safety Management Systems as a Foundation for the Rapidly Evolving Environment <i>Objective: A discussion on Safety Management Systems and State Safety Programmes</i>	Mr. Jeff Duven, Director, System Oversight Division, FAA
Starts at 11:30	Working Lunch	
12:00 – 13:00	UAS Certification Working Group (UCWG) 12:00 – 12:45 Update 12:45 – 13:00 Q&A	UCWG Co-Leads Mr. James Foltz, FAA and Mr. Jonathan Tan, CAAS
13:00 – 14:00	Technical Presentations: Single Pilot Operations and Supersonic Flight <i>Objective: A discussion on the latest research on Single Pilot Operations, as well as developments on Supersonics, and the way ahead.</i> 13:00 – 13:30 Presentations 13:30 – 14:00 Q&A	Mr. Victor Wicklund, Director (A), Policy and Innovation Division, FAA
14:00 – 15:00	Authority Presentations on Regulatory and Policy Initiatives (Continued) <i>Objective: Authorities present on regulatory or policy initiatives to provide a basis for discussion on potential areas of collaboration</i>	Remaining authority updates from Day 2
15:00 – 15:15	Afternoon Tea / Networking	
15:15 – 16:30	Advanced Air Mobility Working Group (AAM WG) Update and AAM Discussion 15:15 – 16:00 Update 16:00 – 16:30 Q&A	AAM WG Co-Leads Mr. James Foltz, FAA and Ms. Rebecca Langton, CAANZ
16:30 – 16:45	The Introduction of UAM Demonstration Program: K-UAM Grand Challenge	Son Dal Hyun, Assistant Director UAM Policy Team, KOCA
16:45 – 17:00	Day 3 Review & Plan for Industry Day	APAC Secretariat

航空安全雙邊協議國年會 Day 3 (11月17日)

<p align="center"> Thursday 17 November 2022 INDUSTRY DAY – Shilla Hotel, Yeong Bin Gwan (Topaz) Virtual Connection: https://faavideo.zoomgov.com/j/1613302109 • Passcode: 080808 </p>		
8:00 – 8:30	Meeting Registration	Industry Day participants only
8:30 – 9:00	Welcome Remarks and Introduction of Participants <i>Authorities Report</i>	Mr. Moon Seok Jun, Director Airworthiness division, KOCA Ms. Lirio Liu, Executive Director, Aircraft Certification Service, FAA
9:00 – 9:45	Hyundai Supernal <i>Objective: Regulatory challenges of bringing a hydrogen fuel cell powertrain to the Regional Air Mobility (RAM) vehicle sector</i>	Tae Yun Choi, Team Lead, RAM Vehicle Development Group
9:45 – 10:30	Hanwha Systems <i>Objective: Hanwha Systems UAM business</i>	Jun Jeongkyu, Director/Team Lead, UAM business development
10:30 – 11:30	Joby Aviation <i>Objective: Joby Aviation AM overview</i>	Greg Bowles, Head of Government and Regulatory Affairs
11:30 – 12:00	SK – Telecom <i>Objective: SKT's UAM business overview & plan</i>	Yongsik Shin, Connect Infra CO, Vice-president
12:00 – 12:15	Comfort Break	
12:15 – 13:15	Working Lunch & Panel Discussion: AAM in Asia-Pacific, Vision to Reality James Foltz, FAA (facilitator) Jun Jeongkyu, Hanwha Systems Tae Yun Choi, Hyundai Supernal Greg Bowles, Joby Aviation Yongsik Shin, SK – Telecom	
13:15 – 13:45	Korea Aerospace Industries (KAI) <i>Objective: Diversification of KAI's aircraft manufacturing field</i>	Jung Min Seok, Manager, Airworthiness Certification Team
13:45 – 15:00	Boeing: Asia-Pacific Outlook and Initiatives <i>Objective: Boeing engagement in Asia-Pacific</i>	Myles Brown, Director of Global Safety & Regulatory Affairs
15:00 – 15:30	Comfort Break	
15:30 – 16:00	IATA <i>Objective: Navigating safely and sustainably out of COVID</i>	(Virtual) Blair Cowles, Regional Director OSS – Safety and Flight Operations
16:00 – 16:45	Korean Air <i>Objective: Lessons learned from the recent health crisis to guarantee a safe, secure and quick restart and recovery</i>	Gilberto Lopez Meyer, Corporate Aviation Safety & Security, Senior Vice President
16:45 – 17:00	Closing Remarks	Industry Representatives Boeing and Korean Air Mr. Moon Seok Jun, Director Airworthiness division, KOCA Ms. Lirio Liu, Executive Director, Aircraft Certification Service, FAA

先進空中交通 (Advanced Air Mobility, AAM) 工作小組議程 (11月18日)

Time (KST)	Topic	Duration
0800-0815	Opening (FAA/CAANZ) ¹	15 Minutes
0815-0845	Introductions ²	30 Minutes
0845-1000	Presentations ³ (Australia, China, Hong Kong)	75 Minutes
1000-1015	--Break--	15 Minutes
1015-1130	Presentations ³ (Indonesia, Japan, Korea)	75 Minutes
1130-1230	--Lunch--	60 Minutes
1230-1345	Presentations ³ (Macau, New Zealand, Singapore)	75 Minutes
1345-1400	--Break--	15 Minutes
1400-1450	Presentations ³ (Chinese Taipei, USA)	50 Minutes
1450-1515	--Break--	25 Minutes
1515-1530	Future Meeting Agenda Items ⁴	15 Minutes
1530-1545	New Items of Discussion (Open to anyone) ⁵	15 Minutes
1545-1600	Closing (FAA/CAANZ)	15 Minutes

- 1) Opening remarks and short recap of last meeting.
- 2) As it has been some time since we last met and this is the first time meeting in person, please introduce yourself and your role.
- 3) APAC members, please prepare a 20-25 minute presentation on your respective certification approach to AAM and use of internationally recognised standards. This item was identified by the group as a discussion topic of highest importance. Please make use of the Huddle site to upload your presentations if possible.
- 4) Review the list of discussion topics for the group for future meeting topics (see page 2).
- 5) Open discussion on any new news or information from the members concerning AAM.

Co-Leads: Rebecca Langton (NZCAA) rebecca.langton@caa.govt.nz
James Foltz (FAA) james.d.foltz@faa.gov

肆、會議紀要

一、主席致詞及大會報告：

本次會議由美國聯邦航空總署航空器檢定部門（Aircraft Certification Service, ACS）執行長官（Executive Director）Ms. Lirio Liu，以及主辦方韓國運輸部副部長（Deputy Minister），兼民航局局長（Korea Office of Civil Aviation, KOCA）Mr. Ha Dong Soo 共同致詞。

FAA 國際事務部門亞太區域辦公室主任 Mr. Chris Carter 則進行大會報告，說明目前航空業界面臨傳統航空發展以來的巨大變化，無人駕駛航空器的出現導致既有航空系統開始進行變革，而因應 B737 MAX 失事事件，後續亦有相關的飛安改善思維。因此 FAA 發布「FY22-26, Flight Plan 21 - The FAA Strategic Plan for the 21st Century」（21 世紀的飛航安全發展計畫），主要重點項目如下：

1. 提出「Global Safety Information Management Exchange (GSIME）」（全球安全資訊管理交換系統），利用人工智慧及大數據技術，更積極有效發現全球潛在飛安風險。
2. 持續協助其他國家強化飛安監理機制（Oversight as a Service）。
3. 於飛航空域導入無人駕駛航空器，例如：遙控無人機、先進空中交通（Advanced Air Mobility, AAM）航空器。
4. 因應商用太空載具發射需求，持續修調相關法規，以因應高高度空域（Upper Class E Airspace）的安全管理。
5. 調整工作優先次序，以因應新興應用領域/科技/議題，以求先期及有效率的進行安全管理。

二、FAA 與亞太各國民航局法規及政策業務近況簡報

（Authority Presentations on Regulatory and Policy Initiatives）

本次會議由 FAA 與會各國民航局，在面對民航環境改變，以及因應國際發展及法規變革趨勢時，對其法規修訂及政策推展部份，向與會各國進行提報，並回復各國提問，以達到相互了解與經驗分享，使亞太區域整體發展趨勢有一致性並提昇飛航安全，本次共有 11 個與會國家進行提報。



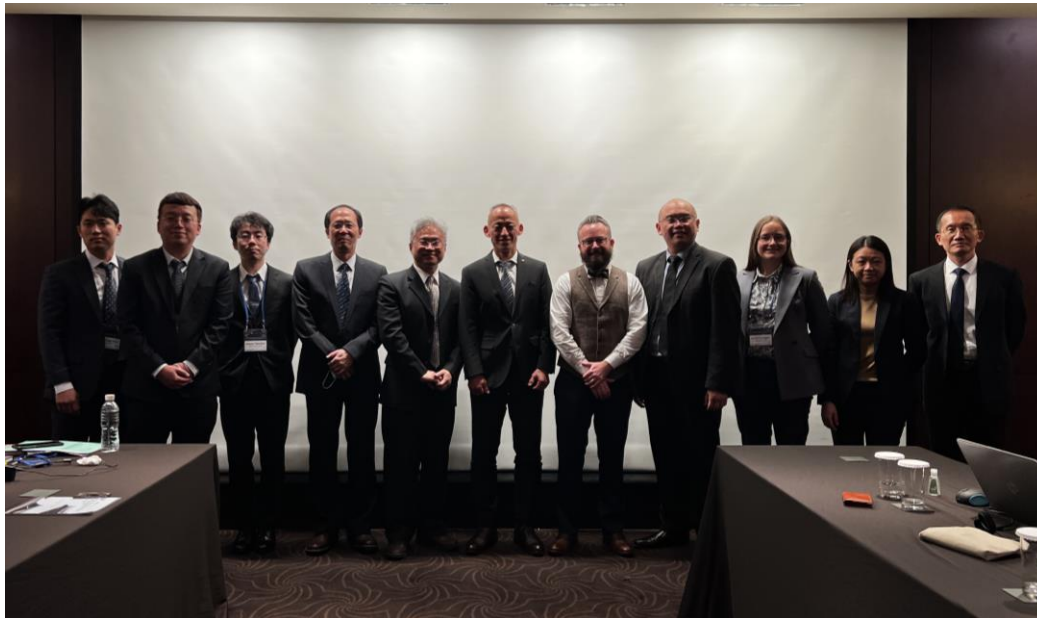
本次美國與亞太雙邊協議國年會本局、FAA 及亞太各國參與人員

本局並就下列議題與各國分享：

1. 疫情下航空運輸復甦的策略：2021 年因疫情的影響客運量減少 98.3%，我國利用稅務減免等財稅方式協助航空公司渡過難關，中華航空與長榮航空為全球少數在疫情期間，仍能獲利的航空公司。
2. 飛航安全的提昇策略：本局利用增補檢查人力，並自 2009 年起執行國家安全計畫，以及推動航空公司落實安全管理系統，於 2019 年達到「零事故」及「10 年移動平均重大事件數低於 3.8 次/百萬飛時」的安全指標，並逐年下降。
3. 擴建桃園國際機場：基於現有機場設施無法滿足未來航空客運量的成長，以及我國與亞太各國平均 2.55 小時飛行時間的絕佳地理位置，具備發展成為亞太空運樞紐的條件，我國已投入興建第三跑道及航廈、更新機場導航設施，以因應未來發展趨勢。
4. 2050 年淨零碳排目標：我國運輸方面貢獻 12.89% 二氧化碳排放量，因此透過發展綠能機場、鼓勵航空公司採用低碳排機型與參加「國際航空業碳抵換及減量 (CORSA)」計畫，並實施性能導航 (Performance-Based Navigation, PBN)，希望能達成 2050 年淨零碳排的目標。

三、主題 1：無人機檢驗工作小組會議（亞太各國無人機檢驗作業現況） （Unmanned Aircraft Certification Working Group, UCWG）

本工作小組係討論有關遙控無人機檢驗議題，由 FAA Mr. James Foltz（Manager, Strategic Policy Emerging Aircraft）及新加坡民航局 Mr. Jonathan Tan（Deputy Director of Unmanned Systems Policy & Regulation / Head of Integration Office）擔任共同主持人。



UCWG 會議各國參與人員

本局亦為此工作小組成員之一，並積極參與議題研討，曾於 2020 年 11 月視訊會議，分享我國無人機檢驗制度，復於 2021 年 5 月視訊會議，再次更新說明我國無人機檢驗制度及案例介紹。

2022 年工作小組會議主題為：視距外飛行安全管理（Beyond Visual Line of Sight, BVLOS）、註冊與無人機射頻識別（Remote Identification/Remote ID）、遙控無人機型別檢定（UAS Type Certification），分述如下：

Topic 1：視距外飛行安全管理（Beyond Visual Line of Sight, BVLOS）

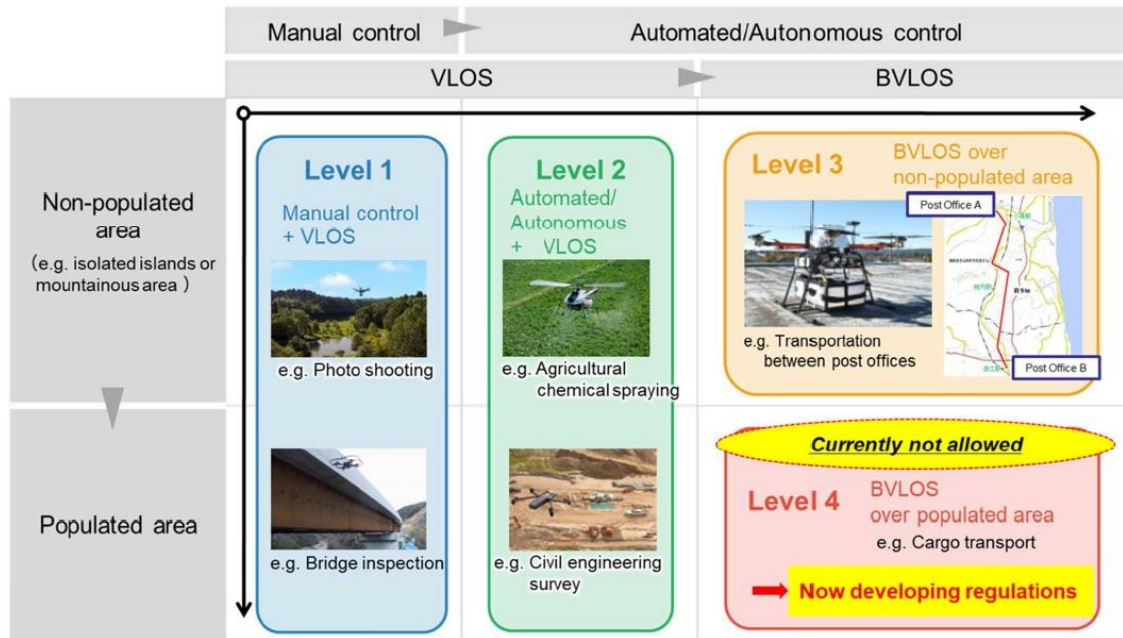
日本

由日本民航局（Japan Civil Aviation Bureau, JCAB）進行說明。

1. 日本 2022 年 6 月 20 日起要求 100g 以上無人機須進行註冊，此與美國及國際一般做法要求 250g 以上無人機才需註冊不同，屬比較嚴格保守管理方式。

2. 型別檢定制度：日本依視距內/外操作、是否飛越人口密集區域、是否自動化操作等 3 項風險條件，將無人機區分為以下之 4 個檢驗類別（Level 1 ~ 4），型別

Category of UAS operation in Japan



Ministry of Land, Infrastructure, Transport and Tourism

檢定法規於 2022 年 12 月 5 日開始生效，並且每 3 年重新檢定一次。

Level 1：視距內、非人口密集區域/人口密集區域、人工操作。

Level 2：視距內、非人口密集區域/人口密集區域、自動化操作。

Level 3：視距外、非人口密集區域，不論操作方式。

Level 4：視距外、人口密集區域，不論操作方式。

3. 型別檢定說明：

Type 1 型別檢定證及適航證書：針對 Level 4 操作類型無人機。

Type 2 型別檢定證及適航證書：針對 Level 1~3 操作類型無人機。

4. 由於 Type 2 型別檢定證及適航證書申請數量多，且風險程序相較 Type 1 型別檢定證（Level 4 操作類型）類型無人機為低，日本民航局將此類檢定工作委託檢驗專業機構（State-Registered Inspection Organizations）負責。符合 ICAO Part 101，對於 25kg 以下無人機操作及作業要求，利用專業機構（Approved Aviation Organization/AAO, Part 101.21）協助無人機檢驗作業之原則。

5. Type 2 型別檢定證，因風險較低，將採用 FAA 耐久性與可靠度飛行測試（Durability and Reliability, D&R Flight Test）方法，進行無人機結構、裝備與系統之安全性確認。
6. Type 1 型別檢定證，因風險較高，將以 FAA Part 23 等適航標準，選擇適用條文做為檢定基礎。

美國

由 FAA 進行說明相關無人機法規研議情形。

1. 美國 2021 年 6 月建立視距外飛行法規委員會（Advisory Rulemaking Committee, ARC），主要關注基礎建設巡檢（例如：油管管線）、商業應用之空拍、物流無人機、農用精準噴藥等應用，但不包含載客載貨之 AAM 航空器。並於 2022 年 3 月 10 日正式發布法規建議報告。
2. 美國 ARC 目前依據各種操作情境（自動化操作、營運模式），歸納出不同風險等級（Acceptable Level of Risk, ALR），並提供相應緩解方向，後續 FAA 將予評估法規修訂優先次序。
3. FAA 將開始考量初始檢定後之無人機修理與改裝，對原始性能之影響，以及相關檢定管理機制，目前傾向參採有人航空器之管理思維。

新加坡

由新加坡民航局（CAAS）進行說明無人機管理機制。

1. 由於偵測避讓裝置（Detect and Avoid, DAA）的發展尚未成熟，目前新加坡對於視距外飛行仍採行操作者核准及活動許可兩個階段進行管理。
2. 對於物流無人機，會要求無人機具備地理圍欄（Geo-Fencing）功能，以確保其飛航保持在既定航道上，並有偏離航道之警告機制。

Topic 2：註冊與射頻識別 (Remote Identification/Remote ID)

新加坡

由新加坡民航局 (CAAS) 進行說明無人機註冊與管理機制。

1. 新加坡要求 250g 以上商用無人機註冊時，必須安裝公發的無人機追蹤器 (UA Tracker)。
2. 無人機追蹤器指定一家廠商 (Garuda Robotics Pte Ltd.) 制作，為 4G 網路式射頻識別裝置 (Network ID，使用 Nano Sim 卡)，重量約 60g，續電力約至少 60 分鐘，目前尚未要求 ASTM F3411 標準之符合。

美國

由 FAA 進行說明無人機射頻識別法規現況。

1. 無人機射頻識別 Part 89 法規草擬階段，FAA 共提出廣播式射頻識別 (Broadcast ID) 及網路式射頻識別 (Network ID) 裝置二種方案，最後考量網路式的推動，須有普及的網路基礎建設，現階段全美尚無法實現，故最終法規僅要求所有 250g 以上無人機註冊時，須具備廣播式射頻識別 (Broadcast ID)。
2. 美國射頻識別法規符合方式有下列三種：
 - (1) 無人機內建廣播式射頻識別功能 (Standard Remote ID)。
 - (2) 無人機外掛廣播式射頻識別模組 (Remote ID Broadcast Module)
 - (3) 在 FAA 同意的指定區域 (FAA Recognized Identification Areas, FRIAs) 活動。此區域由活動團體或學校機關法人提出申請，在此區域活動之無人機可不具備射頻識別功能，一般為休閒娛樂或研發用途，有效期間 48 個月。
3. 美國廣播式射頻識別法規原生效日期為 2022 年 9 月 16 日，所有出廠無人機須備配廣播式射頻識別裝置，後因為 FAA 至 2022 年 8 月 11 日才接受 ASTM F3586-22 做為 Part 89 法規之符合方法，FAA 考量無人機廠商符合時程倉促，故將符合期限展延至 2022 年 12 月 16 日。至於操作人使用具廣播式射頻識別無人機之符合期限，仍維持 2023 年 9 月 16 日。
4. 目前 FAA 將符合 Part 89 之廣播式射頻識別模組或已具備廣播式射頻識別功能之無人機型式，以及相關符合聲明 (Declaration of Compliance, DOC) 資訊公布

於 FAA 網站：<https://uasdoc.faa.gov/listDocs>。目前 FAA 僅做 DOC 審查，並不進行功能實測檢驗，但保留後市場查核及舉報查察等機制。

5. 美國 Part 91 及 Part 107 規定，除非 FAA 另行同意，所有無人機不得安裝 ADS-B Out 裝置。

日本

由日本民航局（Japan Civil Aviation Bureau, JCAB）說明射頻識別推動現況。

1. 日本 2022 年 6 月 20 日起要求 100g 以上無人機進行註冊時，必須同時具備射頻識別功能（準備期：2021 年 12 月 20 日 ~ 2022 年 6 月 19 日）。截至 2022 年 10 月止，日本共註冊 310,000 架無人機。
2. 日本採用廣播式射頻識別（Broadcast ID），並要求符合 ASTM F3411-19 有關射頻識別標準。但日本之要求與美國 ASTM F3411-19 仍有差異：
 - (1) 須同時廣播註冊號碼與序號。
 - (2) 身份驗證須具備至少進階加密標準（AES-128bit-CMAC）。
 - (3) 每秒更新靜態及動態訊息。
 - (4) 傳輸協定：不同意使用 Bluetooth 4 Legacy（因傳輸距離短），僅同意 Bluetooth 5 Long Range、Wi-Fi Aware 及 Wi-Fi Beacon。

Topic 3：遙控無人機型別檢定（UAS Type Certification）

中國大陸

由大陸民航總局（CAAC）進行說明無人機型別檢定做法規畫。

1. 大陸僅針對 25kg 以上無人機執行型別檢定，須符合相關適航標準；對於 25kg 以下無人機則採商品檢驗方式，以符合國家標準為主，大陸民航總局並不介入此部份。
2. 由於在遙控無人機型別檢定部份，尚無國際通行之適航標準，因此大陸將針對型別檢定個案訂定專用條件（Special Conditions, SC），定義其型別檢定基礎。
3. 有關無人機型別檢定法源，將另外訂定新的 CCAR-92，由於此法之訂定，涉及上層民航法之母法修正，故目前尚無完成立法之時程表。

4. 針對 AAM 航空器，大陸目前僅針對無人駕駛航空器的型態（Uncrewed）（註：目前大陸億航即申請無人駕駛航空器之檢定），尚未考量有人駕駛之 AAM 航空器（Piloted/Crewed）型態。
5. 大陸民航總局（CAAC）指出三項目前民航局主管機關面臨的難題：
 - (1) 制訂國際一致性的無人機適航標準。
 - (2) 在型別檢定過程，如何因應營運模式設定合適的系統安全水準（System Safety Objective）。
 - (3) 無人機檢定須與作業許可緊密配合。

美國

由 FAA 說明無人機檢定法源。

1. FAA 對於 eVTOL 的檢定類別，由原來的法源依據 FAR 21.17(a)，改為 FAR 21.17(b)，理由有二：
 - (1) 原來的 FAR 21.17(a)適用於既有的航空器類別（例如：運輸類飛機/Part 25、小飛機/Part 23、直昇機/Part 27 等），而 FAR 21.17(b)則適用於特殊類別航空器（Special Class Aircraft），目前有飛艇（Airship）、滑翔機（Glider）、超輕型載具（VLA-Very Light Airplane）等，考量 eVTOL 不是 FAR 21.17(a)既有航空器類別，因此重新將其歸類於 FAR 21.17(b) Special Class Aircraft 之動力起降航空器（Power Lift Aircraft），以符合檢定法源定位，且相關法規亦已有 Power Lift Aircraft 相關規定。
 - (2) 依 FAR 21.17(b) Special Class Aircraft 之檢定，不要求 eVTOL 的引擎（電動馬達）及螺旋槳（旋翼）須個別檢定取得 Type Certificate (TC)，因此目前 FAA 規劃 eVTOL 之引擎及螺旋槳包含於 eVTOL 的一張 TC 中。
2. 另外，21.17(b) Special Class Aircraft 之檢定基礎，可依專案特性，自行定義檢定基礎，可適用一般無人機型別檢定，以及 AAM 航空器之檢定；而 21.17(a)則循一般既有的航空器型別檢定機制，採用現行之適航標準。

3. FAA 說明低風險之 25kg 以下小型無人機型別檢定符合方法，採用「耐久性與可靠度飛行測試（Durability and Reliability, D&R Flight Test）」，進行無人機結構、裝備與系統之安全性確認，並於 2021 年 7 月 13 日發布 FAA Memorandum AIR600-21-AIR-600-PM01 公告此符合方法。FAA 採行 D&R Flight Test 符合方法的理由有二：
 - (1) 這是過去傳統航空器檢定常採用的符合方法。
 - (2) 對於 25kg 以下小型無人機（small UAS, sUAS），採用 D&R Flight Test 是節省成本，以及達到符合佐證之有效符合方法。
4. FAA 指出其法規要求執行型別檢定時，亦須同步執行噪音檢定（49 U.S. Code 44715 (a)(1)(B)(3) - Controlling Aircraft Noise and Sonic Boom），考量無人機與傳統有人機構型不同、起降場域不同，其噪音標準需另外訂定。FAA 目前是以個案方式制訂（Rule of Particular Applicability – Noise）（Noise Issue Paper, G-3），尚無統一之無人機噪音標準。

印度

由印度民航局（DGCA）說明無人機檢定架構。

1. 印度法規要求 250g~500kg 無人機皆進行型別檢定。
2. 檢定基礎：250g~150kg 無人機採用 JARUS CS-UAS，至於 150kg~500kg 無人機除 JARUS CS-UAS 外，則視需要另增相關適用檢定要求。

四、主題 2：先進空中交通工作小組

（Advanced Air Mobility Working Group, AAM WG）

本工作小組係討論有關遙控無人機檢驗中，風險等級較高的 Risk Class 4, 5, 6 無人駕駛航空器載客與載貨相關管理議題，由 FAA Mr. James Foltz（Manager, Strategic Policy Emerging Aircraft）及紐西蘭民航局 Ms. Rebecca Langton（Emerging Technologies Program Manager）擔任共同主持人，本局亦為此工作小組成員之一，大部份工作小組成員與無人機檢驗工作小組（UCWG）一致，可確保兩個工作小組研議項目不致於重疊，並保持緊密的銜接與配合。

本工作小組主要研討的主題為：

1. 城市空中交通（Urban Air Mobility, UAM）（空中載客計程車）：包含有人駕駛及無人駕駛兩種型態。
2. 城際貨物運送。
3. 電動垂直起降航空器（eVTOL）。
4. 複合式營運操作（Complex Concept of Operation/CONOPS）。
5. 新穎的航空器構型設計。

工作小組針對 AAM 航空器驗證議題，有下列幾個面向的研討項目：

1. 檢定基礎：基本上以引用 FAR Part 23 等最新之性能規範要求（Performance Based Requirements, PBR）做為檢定之適航標準。
2. AAM 航空器驗證的特殊考量點：
 - (1) 系統安全分析（System Safety Analysis, SSA）目標之設定。
 - (2) 高強度輻射場域（High Intensity Radiated Fields, HIRF）防護及抗雷擊能力。
 - (3) 遭受鳥擊（Bird Strike）之結構安全。
 - (4) 重要動力失效時之航空器性能要求。
 - (5) 全部動力失效之共模分析（Common Mode Analysis, CMA）與處置能力。
 - (6) 對於採用線傳控制（Fly-by-Wire）之航空器操控安全設計。
3. 對於純電引擎之驗證方法與要求，並考量是否需與機體分別驗證。
4. 航空器適墜性（Crashworthiness）驗證考量：包括乘客（及/或駕駛員）座椅與其搭接結構強度要求，以及對於燃油箱及電池安裝之安全要求。此項尚需考量各種不同的新穎航空器構型設計而訂。
5. 避免人為操作疏失：電量使用情形指示要求、保留備用電量需求，以及電能輸出功率指示。
6. 由有人駕駛過渡至無人駕駛之階段式驗證要求。

各國 AAM 檢定及發展策略簡介

美國

由 FAA 說明 AAM 航空器檢定基礎。

1. FAA 對於垂直起降（eVTOL）AAM 航空器的檢定基礎，採用 FAR Part 23 Amendment 23-64，此適航標準為近來新改寫的以性能為基礎之標準（Performance Based Rule, PBR），適合不同航空器構型之檢定，亦適合做為 eVTOL AAM 航空器之檢定基礎。
2. FAR Part 23 Amendment 23-64 已包含資通安全（Cybersecurity）要求。（註：FAR Part 25 為傳統條列式適航標準，則須再另訂有關 Cybersecurity 特殊條件，以滿足檢定需求）
3. 目前 FAA 已針對美國 Joby Aviation 新創公司所開發之 S4-1 機型公布其檢定基礎草案（Notice of Proposed Airworthiness Criteria），除引用 FAR Part 23 Amendment 23-64 做為檢定基礎，其中更有多項改寫現有標準以適用於 S4-1 設計之檢定要求，但基於 FAA 將 AAM 航空器檢定法源改為 FAR 21.17(b)動力起降航空器（Power Lift Aircraft），可提供檢定基礎的立法彈性，此類新改寫的標準，過去需以特殊條件的審核流程，最後才成為檢定基礎的一部份，而目前即與全部檢定基礎合併公告即可，節省不少行政流程。

中國大陸

由大陸民航總局（CAAC）說明 AAM 航空器檢定基礎。

1. 目前民航總局對於億航（Ehang）EH216-S 之 AAM 航空器檢定基礎，則是以 EASA SC-VTOL-01 為主，參採適用的 FAR Part 23 Amendment 23-64，以及相關的國家標準（註：大陸基於發展歷史，已公布許多無人機國家標準）。
2. 相關符合方法可能採行適用的美國 ASTM 共識標準（Consensus Standards）。

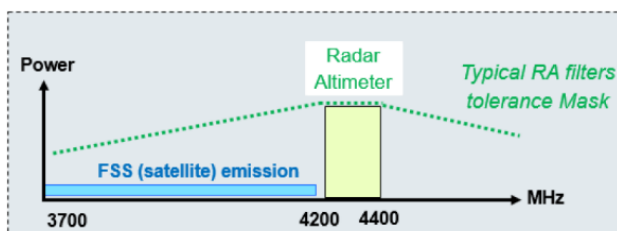
五、主題 3：5G 訊號對於航空器無線電高度計干擾飛安議題 （Technical Presentation: 5G and Spectrum）

由於各國 5G 行動通訊技術使用的頻段 C-Band 3.7 GHz~ 3.98 GHz 與航空器機載設備無線電高度計（Radio Altimeter, RA）使用頻段 4.2 GHz~ 4.4 GHz 非常接近，有信號干擾之虞，嚴重則可能導致其失效，而危害飛航安全。

How did we get here?

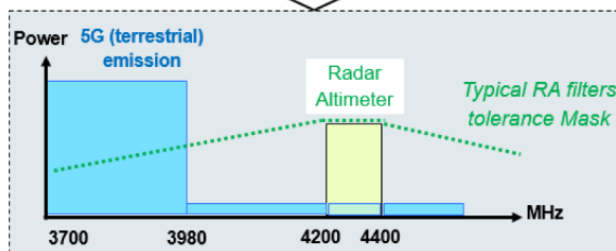
•RTCA Report Context

•Today



•Equipment standards expect “blue” emissions to be below the dotted green line.

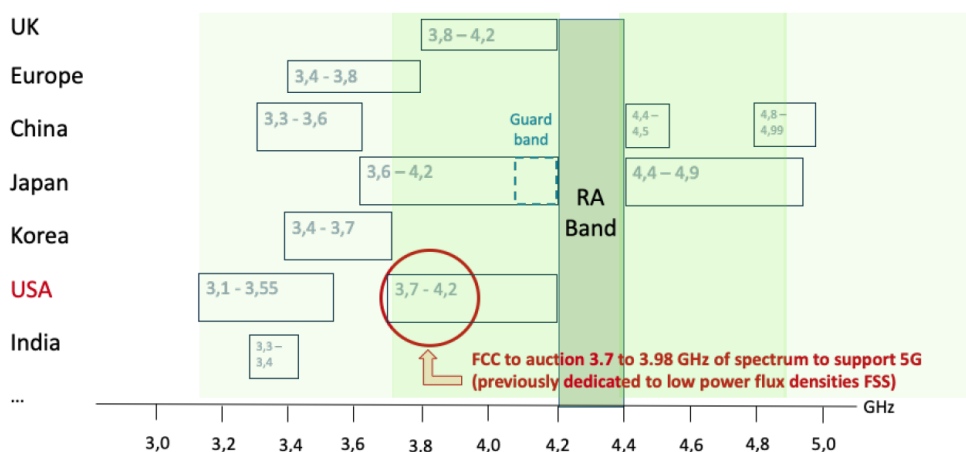
•Tomorrow



5G 行動射頻強度超過雷達高度計容許限制

World View of Future 5G Spectrum Reallocation

•RA can still “hear” signals below its band



各國 5G 行動頻段非常接近雷達高度計頻段

FAA 於 2021 年 2 月 10 日與亞太各國民航局 COS Forum 視訊會議首次揭露此項潛在飛安風險議題。FAA 後續 2021 年 11 月 2 日發布特殊適航資訊通報 SAIB AIR-21-18，對相關航空業者提出建議。並接續於 2021~2022 年發布下列各項適航指令：

1. 所有波音及空中巴士機型：2021 年 12 月 9 日發布 FAA 適航指令 2021-23-12（我國適航指令編號：CAA-2022-01-006）。
2. B787 機型：2022 年 1 月 19 日發布 FAA 適航指令 2022-02-16（我國適航指令編號：CAA-2022-01-005）。
3. B777 機型：2022 年 1 月 27 日發布 FAA 適航指令 2022-03-05（我國適航指令編號：CAA-2022-01-010）。
4. B737 機型：2022 年 2 月 24 日發布 FAA 適航指令 2022-05-04（我國適航指令編號：CAA-2022-02-014）。
5. B747 機型：2022 年 3 月 16 日發布 FAA 適航指令 2022-06-16（我國適航指令編號：CAA-2022-03-015）。

基於全美電信業者 5G 頻段陸續開設，以及航空器無線電高度計（Radio Altimeter, RA）改裝亦須要時間完成，因此 FAA 自前述適航指令發布以來，持續追蹤全美各大機場 5G 基地台佈建及調整狀況，以及飛機及無線電高度計供應商更新改善情形，發布相關的飛航公告（Notice to Air Missions, NOTAM）及適航指令的替代符合方法

（Alternative Means of Compliance, AMOC），逐步控管 5G 訊號對於航空器無線電高度計干擾之飛安議題。目前 FAA 每月所需完成的工作項目，包括：

1. 評估 5000~8000 座 5G 基地台佈建及調整狀況。FAA 將優先評估考量客運量每年乘客人數 10,000 人以上、貨運量 1 億噸以上之大型機場。
2. 發布相關的飛航公告（Notice to Air Missions, NOTAM）及適航指令的替代符合方法（Alternative Means of Compliance, AMOC）。
3. 與 5G 業者及飛機及無線電高度計供應商召開定期研商會議。

目前 FAA 評估即使飛機無線電高度計改裝更新後，仍需有下列項目的配合條件，方能確保安全無虞，若任一條件無法滿足，則需再進一步評估其相關風險：

1. 5G 行動通訊頻段與飛機無線電高度計頻段（4.2 GHz~ 4.4 GHz），仍需保留有護衛頻段（Guard Band 220 MHz）之間隔。
2. 機場四周 5G 基地台須降低其發射功率。

3. 機場四周 5G 基地台須限制其「混附發射（Spurious Emissions）」。
4. 機場四周 5G 基地台須調整天線方向向下。

FAA 目前共收到 552 件疑似 5G 干擾報告，經過濾後約有 92 件相關。而我國電信業者使用 5G 頻段與飛機雷達高度計頻段相隔較遠，但為主動防範可能風險，本局已採用前述 FAA SAIB AIR-21-18 內容，於 2022 年 1 月 20 日發布飛安公告 ASB No: 111-066/O，要求國籍航空公司採取以下措施：

1. 對各構型雷達高度計如何影響飛航進行 SMS 風險評估。
2. 提醒乘客在飛行期間應關閉 5G 設備或切換成飛航模式。
3. 從航空器或雷達高度計製造者取得相關資訊。
4. 航空器使用人應確使其駕駛員了解可能的雷達高度計異常情況，及因而導致之相關系統功能喪失，與後續緊急操作程序。
5. 發生雷達高度計異常情況時，航空器使用人與駕駛員應向飛航管制單位詳實通報。

六、主題 4：持續操作安全論壇 (Continued Operational Safety/COS Forum)

本工作小組於 2019 年由 APAC 執行委員會（EC）同意成立，旨在分享航空產品設計國（State of Design, SoD）檢定及飛航安全經驗，而航空器註冊國（State of Registry, SoR）則反應或分享航空器運作遭遇困難點或經驗，以達到安全資訊分享之目的，同時可了解安全回報機制及處理流程，以促進飛安事件之通報順暢與處理，並可針對潛在之操作安安議題及時傳達訊息並研議處理方案，以達到提昇亞太區域飛航安全之目標。

APAC COS Forum 約定每 3 個月由 FAA 與亞太各國民航主管機關召開 1 次，截至 2022 年 11 月共召開 15 次會議，本局皆積極與會，以掌握相關飛安趨勢與發展資訊。其中討論許多受矚目的安全議題如下：

1. 波音 737 NG 機型：加強檢查及改正機身與機翼結構搭接主要結構（Pick Fork）出現裂紋問題，後續 FAA 並發布取代版適航指令（AD）2021-09-06。
2. 波音 777 使用 PW4000 發動機之機型：2018, 2019, 2020 分別於美國境內及日本發生風扇葉片斷裂導致發動機失效，並造成發動機外罩飛脫之危險情況。

APAC COS Forum 所建立之亞太各國飛安資訊通報及分享機制如下：

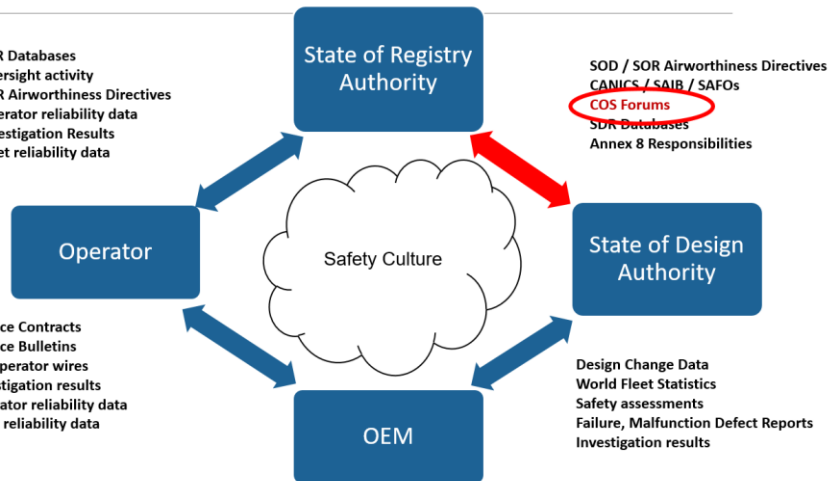


Benefits of COS Forum

- Increases safety around the world by fostering a common safety culture.
- Develops partnership relationships and establishes contacts CAA to CAA
- Provides infrastructure for rapid response to major disruptions
- Ties together Design, Maintenance and Operations
- Enhance execution of ICAO Annex 8 responsibilities
- Reduces need for unilateral actions by SOR

SDR Databases
Oversight activity
SOR Airworthiness Directives
Operator reliability data
Investigation Results
Fleet reliability data

Service Contracts
Service Bulletins
All Operator wires
Investigation results
Operator reliability data
Fleet reliability data



23rd FAA – APAC Bilateral Partners Dialogue Meeting | Seoul, South Korea, 14 – 18 November 2022

6

會議中 FAA 提到 APAC COS Forum 未來涵蓋及研議的主題方向為：

1. 將亞太各國主要使用之航空產品列為會議探討研議之標的。
2. 提供發展中的飛安相關議題與資訊。
3. 對於亞太區域高矚目的飛安議題，探討可能發生因子。
4. 由亞太各國提出其所關心之安全議題，並進行研討。
5. 優化持續操作安全（COS）風險評估流程。
6. 探詢提昇航空器持續操作安全的協力合作機會。

七、主題 5：遠距監理策略工作小組 (Surveillance Strategies Working Group)

本工作小組係討論因應 COVID-19 導致主管機關無法進行實地查核，因而利用遠距科技（Remote Technology, RT）進行檢查的相關作業機制，以及作業標準化議題。由 FAA Ms. Susan Kerekes（Acting Manager, Phoenix MIDO Section）及日本民航局 Mr. Kenji Miyabe（Senior Aeronautical Engineer – Aircraft Design, Aircraft Engineering and

Certification Center) 擔任共同主持人。工作小組於 2022 年 4 月成立，為期 2 年，5 月召開首次會議，本局亦為此工作小組成員之一。

利用遠距科技進行檢查是一項新興的作業模式，工作小組希望藉由各國之間相互的經驗分享與合作，除解決目前因為疫情而造成實地查核之出差限制，也可做為未來一項具有替代性且有效率的檢查方式，因此工作小組目的如下：

1. 分享亞太各國民航主管機關使用遠距科技之原則及政策。
2. 分享應用遠距科技進行檢查的情境，例如：檢查關鍵零組件、特殊製程、品質系統稽核、零件製造與組裝。
3. 分享不適用遠距科技進行檢查的情境。
4. 分享遠距監理相關執行經驗。
5. 訂定使用遠距監理的風險評估項目及評估方法。
6. 律定進行遠距監理的科技及相關裝備（視訊軟體、影像設備、照相設備）。

目前 FAA/EASA/Aerospace Industries Association (AIA) 已分別發布相關指引文件及工業標準可供執行遠距監理之參考：

1. 歐盟 EASA：CM-21-A-B-001, Issue 2, Certification Memorandum – Real-time remote participation for witnessing tests and inspections。
2. 美國 FAA：Policy Statement, PS-AIR-21-1901, Use of Remote Technology During the Performance of Inspections and Tests。
3. 美國航太工業協會 AIA：National Aerospace Standard (NAS)413, Remote Verification Implementation Guide。

八、主題 6：因應航空產業快速變化的安全管理系統 (Safety Management Systems/SMS as a Foundation for the Rapidly Evolving Environment)

FAA 過去已針對航空公司 (Part 119, Part 121 Air Carrier) 要求執行 SMS，並制訂 Part 5 SMS，目前將依據 ICAO Annex 19，要求航空產品製造廠導入 SMS (Manufacturer SMS, MSMS)，並修訂現有 Part 5 SMS 相關規定。

FAA 2020~2025 年國家安全計畫 (State Safety Program, SSP)，對應製造廠導入

SMS，其檢定部門也開始進行下列改革：

1. 成立安全計畫管理分部（**Safety Program Management Branch**）。
2. 成立檢定部門的安全委員會（**AIR Safety Committee**）。
3. 檢定部門強化下列項目之參與及管理：
 - (1) 航空器失事調查。
 - (2) 強化參與製造廠安全小組與 FAA 安全小組。
 - (3) 設立飛安事件資料庫：<https://lessonslearned.faa.gov/>。
4. 強化檢定部門人員 SMS/SSP 訓練。
5. 持續評估與 ICAO Annex 19 符合性與執行效能。

九、主題 7：單駕駛操作及超音速飛行

（**Single Pilot Operations and Supersonic Flight**）

FAA 提出隨著駕駛員短缺、航空器高度自動化，將開始研究有關單駕駛操作（**Single Pilot Operations, SPO**）或是駕駛人員簡化（**Reduced Crew Concept, RCC**）的議題，這也涉及駕駛艙的改裝或重新設計，但需面臨安全的挑戰，亦即須證明單駕駛須能處理過去雙駕駛才能處置的緊急狀況，例如：一位駕駛員失能時。駕駛人員簡化（**Reduced Crew Concept, RCC**）的議題包括下列面向：

1. 單駕駛操作（**Single Pilot Operations, SPO**）
2. 延長最低組員操作時間（**Extended Minimum Crew Operations, eMCO**）
3. 單駕駛及備用第二駕駛操作（**Single Pilot – Second Pilot Optional, SPPO**）
4. 備用駕駛操作（**Pilot Optional Operations**）：例如，將有人機改裝成無人駕駛航空器，該航空器可供單駕駛操作，或改換以遙控方式或全自動化操作。
5. 全自動化操作（**Fully Autonomous Operations**）：例如，全自動飛行之 **AAM** 航空器。

同時 FAA 也面臨目前共有 10 家公司正在研發超音速（**Super Sonic/SS**，飛行速度大於 1 馬赫）及超高音速（**Hyper Sonic/HS**，飛行速度大於 5 馬赫）航空器，除了早在 1970 年代已訂立的適航標準，尚有 25 個新興技術項目有待訂立相關檢定要求。

此外，超音速/超高音速飛行除檢定議題外，尚有營運及基礎建設的議題有待解決：

營運

1. 美國法規限制不可在人群上空以超過 1 馬赫的速度飛越。
2. 超音速/超高音速飛行，如何與一般航空器飛行進行交叉航管的議題。
3. 起降能見度問題，可能需借助人工影像系統（Artificial Vision Systems）協助。
4. 高度 60,000 呎以上飛行的航管問題。

基礎建設

1. 機場對於新型態燃料之補給及添加等議題。
2. 機場現有登機門對於新設計構型（例如：具備大型三角翼構造），如何安排登機等議題。
3. 機場消防與救護議題。

目前 FAA 已積極與 ICAO、NASA 及 FAA 航空永續發展中心（Aviation Sustainability Center, ASCENT）合作處理相關議題。

十、各國出席人員

本次我國仍以美國雙邊協議簽署名稱 CHINESE TAIPEI 出席。

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伍、心得與建議

- 一、 遙控無人機檢驗是近來各國所面臨的航空器檢定新課題，本局自 2020 年 3 月 31 日施行「遙控無人機管理規則」以來，已陸續針對 25kg 以上無人機，完成 7 項市售型無人機型式檢驗、11 項業者自製使用或研發型無人機特種實體檢驗，並完成型式檢驗通過後量產之無人機實體檢驗共 348 架次，相較於日本預計於 2022 年底開始執行無人機檢驗，而美國目前以 FAR 21.27(b) Special Class Aircraft 方式執行部份無人機型別檢定，我國已累積更多之無人機檢驗執行經驗。
- 二、 本次會議對美國及日本推動無人機射頻識別以及其產業的發展情況有明確了解。日本的作法，可做為我國推動無人機射頻識別的規劃參考。
- 三、 本局將依據新科技及無人機產業發展，持續檢視並提昇我國之無人機檢驗制度，以確保未來與其它國家開始將雙邊協議延伸至無人機領域時，與 FAA 等國相關雙邊協議洽談進度，並推動我國無人機產品拓展國際市場。
- 四、 本局仍將積極參與各項 APAC 無人機檢驗工作小組 (UCWG)、AAM 工作小組會議及各項國際會議，汲取各國驗證制度發展趨勢與經驗，做為我國無人機相關法規、程序調整修訂之依據。
- 五、 先進空中運輸 (Advanced Air Mobility, AAM) 航空器 (AAM 航空器) 是世界各國新興航空器設計發展趨勢，目前世界上已陸續有近 700 項 AAM 航空器發展專案進行或發表，我國目前僅為小型發展專案階段，預估將面臨國外 AAM 航空器引進國內營運或測試之可能，本局已公布採用歐盟相關規範以預為因應，仍持續參考國際經驗據，調整相關策略方針，並蒐集各國對於類似空中計程車之航空器檢定方式、適航標準及檢定程序等。
- 六、 為增加無人機續航力，未來採用氫燃料將是新興趨勢，本局目前已有執行田屋公司與工研院材化所 AXH-E230FC 氫燃料無人直昇機特種實體檢驗之初步檢驗經驗。而美國近期所訂定 magniX USA Inc. 純電引擎型別檢定基礎 (參照 FAR 33 訂定 Special Conditions)，本組亦將評估其適用性，以為訂定未來我國無人機純電引擎之檢驗基準參考。本局為 APAC AAM 工作小組成員之一，將藉此機會了解國際間針對此新興類型航空器之檢定考量及檢定方式。

陸、附件：會議簡報資料



Near Term Objectives of CAA/Chinese Taipei

**Presented by
CAA/Chinese Taipei
November 16, 2022**



What are the near term objectives?

- **Restoration of Commercial Aviation**
- **Comitment of Flight Safety Improvement**
- **Development of Taoyuan Aerotropolis**
- **Achievement of Carbon Neutrality by 2050**

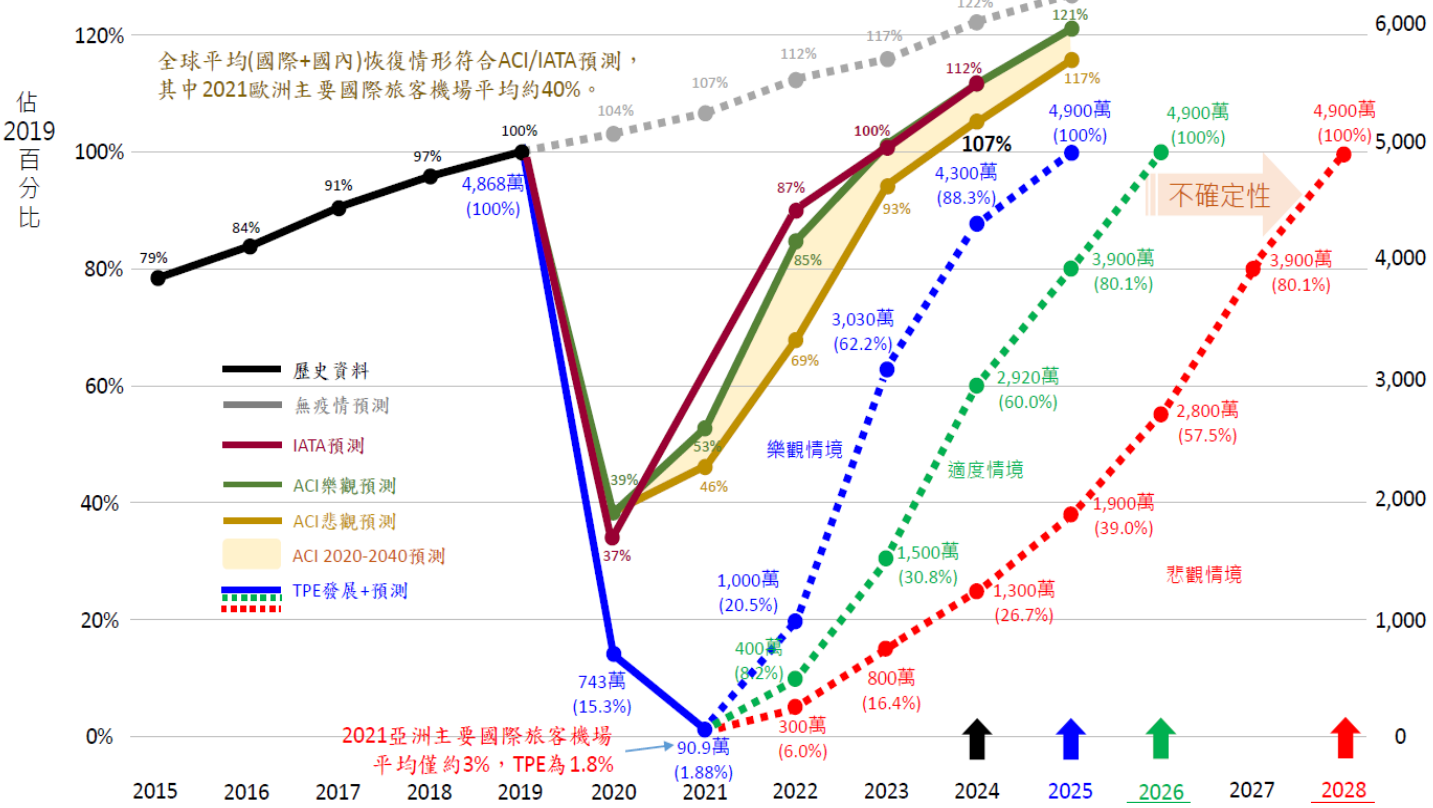


Objective 1

Restoration of Commercial Aviation

Why is it important?

ACI vs TPE疫情運量分析 桃園機場2022預測400萬(8.2%)



- Taiwan aviation industry was severely impacted during the COVID-19 epidemic.
- International civil aviation dropped significantly.
- In 2021, 98.3% air transportation volume decrease, as compared with 2019.



What is the strategy to address it?

- During the epidemic, one relief package is proposed, including tax exemption, loan extension, rent allowance, and subsidy etc. are granted for airlines.
- CAA assisted airlines to carry cargo in passenger cabins, and converted passenger aircraft into cargo aircraft.
- Result: Overall revenue of Taiwan airlines still grew in 2021.
 - Two major airlines, EVA and China Airline, are two of the few airlines in the world that make profit during the epidemic.



Objective 2

Commitment of Flight Safety Improvement

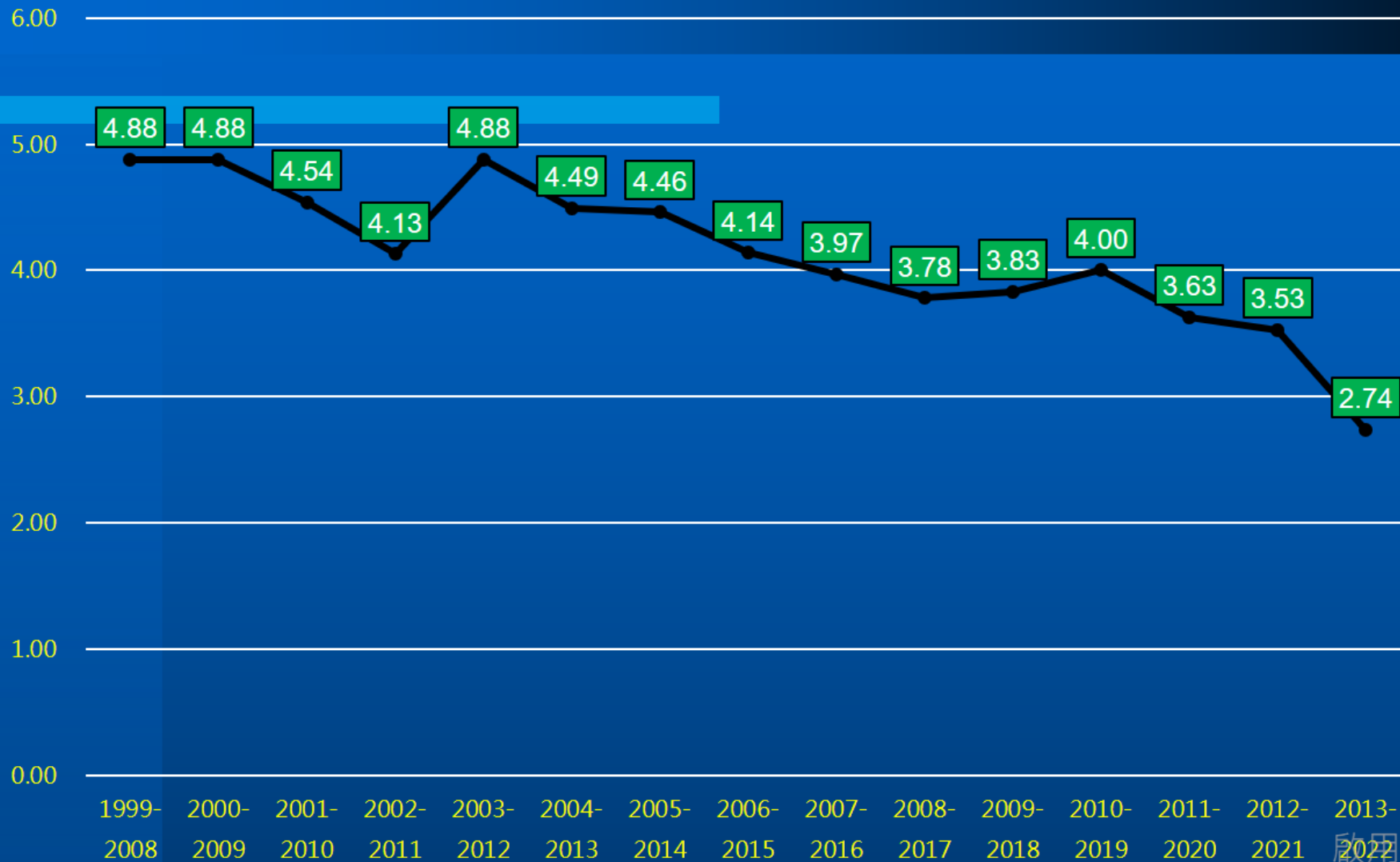


Why is it important?

- **Flight safety serves as the top priority of CAA/Chinese Taipei surveillance activities.**
- **Predefined safety target for Taiwan's commercial aviation sector:**
 - **Zero accident**
 - ✓ No jet plane fatal accident since 2015.
 - **10yrs moving average of major incident < 3.8 times/per million flight hrs.**
 - ✓ Achieved in 2019, and remains declined trend since then.

Major Incident Rate of Taiwan Airlines (10 yrs Average)

Major Incident rate(per mil.flight hrs)



Target: 10 Yrs Moving Average < 3.8 /per mil flight hrs

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What is the strategy to address it?

- Now 282 CAA/Chinese Taipei issued airworthiness certificates remain effective.
- CAA introduced the aviation safety inspection system to carry out surveillance tasks.
 - 79 Aviation Safety Inspector(ASI) of various disciplines are recruited to ensure regulatory compliance and airworthiness of Taiwan's fleet.
 - CAA plans to recruit additional 20+ ASI in the near future.
- SSP and SMS is also introduced since 2009.
- From time to time, CAA's oversight functions and responsibilities will be reassessed and modified as deemed adequate.



Objective 3

Development of Taoyuan Aerotropolis

Why is it important?

1. Existing capacity doesn't meet growing traffic demand



- ❑ Taoyuan International Airport (TTIA)
- ❑ Taiwan's main international airport
- ❑ Total capacity of 37 million.
- ❑ In 2019, volume of passengers reached 48.69 million.

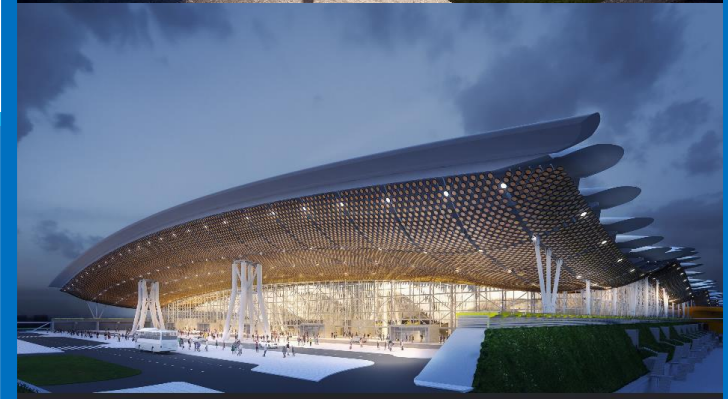
2. Outstanding location of TTIA



- ❑ Located as the hub in the Asia-Pacific region
- ❑ Average flight time to major cities in this region is only 2:55.

Taoyuan aerotropolis plan is proposed

Aerotropolis Plan of Taoyuan International Airport



Total area reaches
4,564.26 ha

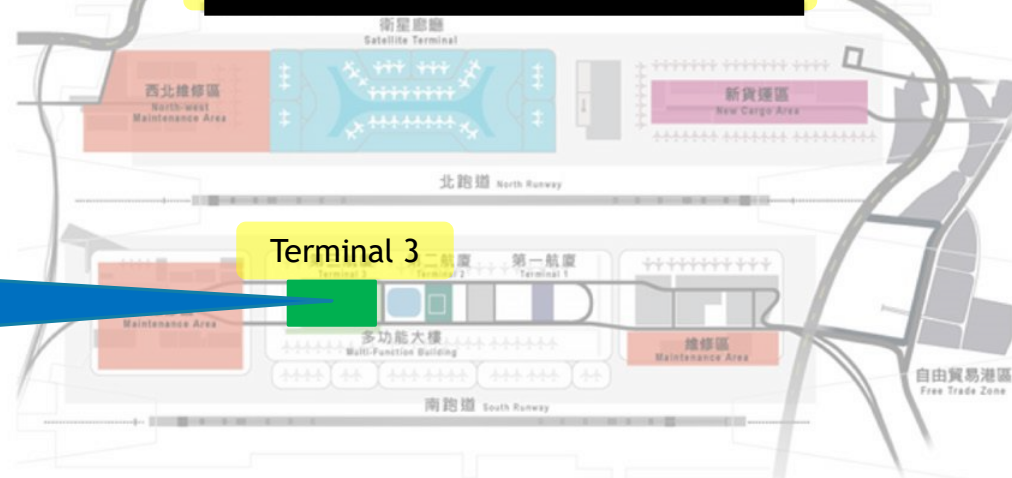


- Taoyuan Aerotropolis Designated Plan Area
- Taoyuan International Airport Area
- Land Resumption



Taoyuan International Airport Area (~2040)

The 3rd runway



Terminal 3

- Taoyuan International Airport could quickly connect the major cities in Asia
- Promoting Aerotropolis plan to meet the continuous growth of traffic
- Carry out various expansion and renovation construction project
- Investment: 17 billion USD

- Passengers capacity: 45 million
- Economic benefits: 40 billion
- Jobs: 156 thousand



What is the strategy to address it?

- **17 billion USD investment.**

- **Target**

- **Completion of Terminal 3, designed capacity 45 million passengers, by 2026.**
- **Completion of 3rd runway and new navigation facilities, by 2030.**

- **Expected benefit**

- **Economic benefits: 40 billion USD.**
- **New Job positions: 156 thousand.**



Objective 4

Achievement of carbon neutrality by 2050



Why is it important?

- In Taiwan, presently transportation sector comprises 12.89% of overall carbon emission.
- Taiwan pledges to achieve carbon neutrality (net-zero) by 2050, for sake of global warming alleviation.



What is the strategy to address it?

■ Achievement of carbon neutrality by 2050

- keep environmental sustainability and green airports
- Encourage airlines to purchase more fuel efficient, low emission aircraft.
- Participate international CORSIA(Carbon Offsetting and Reduction Scheme for International Aviation) mechanism.
- Taiwan has implemented Performance-Based Navigation (PBN).



Carbon Offsetting and Reduction Scheme for International Aviation (CORSI A)

2050 Net-zero Transition
Cooperating with the world and striving for a net-zero future together

TAIWAN 2050

1. Wind/Solar PV
2. Hydrogen
3. Innovative Energy
4. Power Systems & Energy Storage
5. Energy Saving & Efficiency
6. Carbon capture utilization & storage (CCUS)
7. Carbon-free & electric vehicles
8. Resource Recycling & Zero Waste
9. Carbon Sinks
10. Green Lifestyle
11. Green Finance
12. Just Transition

- Taiwan’s pathway to net-zero emissions in 2050
- Fully commitment of Taiwan to the implementation of CORSIA

Environmental sustainability and green airports



Power generation
4.372 million
kWh/year



CO₂ reduction
2,331 tons/year



- Through the action taken, several airports in Taiwan have been certified as carbon accreditation
- 49 new and more efficient aircrafts will join the new fleet in the next 2 years



**Federal Aviation
Administration**



Chris Carter
Director, Asia-Pacific Region
23rd Asia Pacific Bilateral Partners Dialogue Meeting
Seoul, Korea
November 15, 2022

Strategic Leadership in Asia Pacific Region

As we work to recover from the change brought about by the COVID-19 pandemic, the global aviation community has worked diligently to ensure the safety of the flying public through...

- ✓ Strength in Global Partnership
- ✓ Continued Global Aviation Safety

We are also turning our attention to new challenges..

- ✓ Embracing new technologies and operational profiles
- ✓ Transformation of the traditional aviation ecosystem
 - Uncrewed Aviation Systems
 - Advanced Air Mobility
 - Urban Air Mobility



Mental Health in Aerospace

Aviation system challenges pre-COVID. Unique challenge of mental health associated with COVID-19 in aerospace highlighted these issues

Stressors associated with COVID-19 include:

- ✓ Family dynamics
- ✓ Financial
- ✓ Loss of loved ones and others in the community
- ✓ Isolation
- ✓ Infection and long-COVID effects
- ✓ Uncertainty



The FAA has implemented the following to support the aviation community:

- ✓ Championing Pilot Peer Support Programs
- ✓ Expanding Mental Health content in Aviation Medical Examiner (AME) seminars
- ✓ Improving Decision Grid tools in the FAA AME Guide
- ✓ Exploring new medications for approval
- ✓ Educating at every opportunity



Asia Pacific Region and COVID-19

The FAA has worked in partnership over past three years to:

- ✓ Return Boeing 737 MAX to service
- ✓ Utilize ICAO's Council Aviation Recovery Task Force (CART) Mechanism
- ✓ Share information through the APAC COVID-19 Contingency and Recovery Planning Group (ACCRPG)
- ✓ Participate in-person in Regional Meetings.
 - FAA Assistant Administrator for Policy, International Affairs and Environment led the U.S. delegation to DGCA57
 - Regional Aviation Safety Group – Asia Pacific (RASG-APAC 12) meeting in Bangkok, Thailand
 - Asia Pacific Air Navigation Implementation Group (APANPIRG/33) meeting in Bali, Indonesia
 - Southeast Asia Regional Safety Symposium in Jakarta, Indonesia
 - 52nd Asia Pacific Economic Cooperation (APEC) Transportation Working Group and Aviation Experts Group in Bangkok, Thailand



FAA's Flight Plan 21

Flight Plan 21, FAA's latest strategic plan announced in 2022

Focuses on our continued commitment to Safety, People, Global Leadership and Operational Excellence through an ever-evolving framework

This guides our approach to the challenges and opportunities of the future – innovation, safety advances and international developments

The FAA recognizes the need to proactively adopt the latest innovation in technology, people management and strategy while remaining disciplined in safety and consistent in sustainability



**Federal Aviation
Administration**

Global Safety Information Management Exchange (GSIME)

This initiative aims to facilitate a global safety information exchange that will promote structured and timely access to safety data allowing a more holistic analysis and aligned safety outcomes

The GSIME is under the Global Leadership Pillar

- ✓ Aviation by its very nature is global and responding to current and future challenges requires collaboration
- ✓ Seek to share safety intelligence information among our international aviation partners related to the aviation lifecycle
- ✓ Leverage data/information to enable new perspectives on operational hazards
- ✓ Foster collaboration through the proactive exchange of safety data and information among international aviation stakeholders



Federal Aviation
Administration

GSIME in Flight Plan 21

Globalization of industry and recent air transport incidents and accidents are highlighting the need for global safety data sharing across the aviation lifecycle that produces improved, comprehensive safety analysis for timely safety decisions

Use Case	Operational Need
Continued Airworthiness	States of Design, which is the state who has jurisdiction over the organization who is responsible for an aircraft's type design, in general require richer data sets from global aircraft operations for enhanced safety analytics.
Cargo Safety	Limited safety information sharing on cargo safety prevents global understanding of safety issues related to global cargo risks and mitigation strategies related to dangerous goods (hazardous materials) in the air transportation system.
Safety Management Practices, Process, and Tools	Improve exchange of safety management practices, tools, algorithms, etc. to increase safety levels and identify areas of improvement.
Shared Surveillance Concept	Duplicative oversight activities and requirements result in inefficient resource allocations for regulators. Regulated entities may be certified by multiple CAAs, who are performing similar oversight activities. If CAAs are able to share safety oversight information with other partners, it may reduce the need for duplicative activities and promote greater alignment of oversight methodologies.
Oversight as a service	Less developed CAAs may need assistance to conduct safety analysis to derive insights.



Safety Culture in Flight Plan 21

FAA includes Safety Culture under the Safety Pillar in Flight Plan 21

Safety culture enhancement journey: development of co-existing, inter-connected sub-components make up Positive Safety Culture:

- ✓ Just Culture: A culture that discourages blaming an individual for an unintentional mistake that contributes to an incident
- ✓ Reporting Culture: Employees are willing and able to report safety hazards and concerns
- ✓ Learning Culture: A culture that learns from its mistakes and makes changes where improvements are identified
- ✓ Flexible Culture: Adapting effectively to changing demands
- ✓ Informed Culture: Collects and analyses relevant data, and actively disseminates safety information

FAA presented working paper at RASG-APAC/12.



Federal Aviation
Administration

Safely Enable Emerging Entrants

Holistic, integrated enterprise approach

Team of subject matter experts from across the FAA created to:

- Establish a repeatable enterprise process to integrate emerging entrants safely into the National Airspace System (NAS)
- Identify and implement changes to the FAA regulatory process and policy that meet both public and private needs
- Continue to develop UAS strategy and programs to best enable their integration into the NAS
- Optimize airspace usage with respect to commercial space launch and reentry



**Federal Aviation
Administration**

Emerging Entrants in Flight Plan 21

• Enterprise Solution

- Emerging Entrants Team: Establishes who/when/how/where
- Enterprise Solution/Process: Creates collaboration, awareness, involvement by all Lines of Business and Staff Offices with applicants
- Creates a process for the agency to prioritize applications/technologies/issues as they emerge

• UAS Strategy

- Top down actionable UAS integration strategy that aligns UAS integration activities across the agency. This approach then informs and supports the agency vision for new entrants with one actionable, agency-level strategic framework
- Data sharing and communications – Integrate beyond data with test site data, develop data analysis plan, focus groups with stakeholders, safety analysis, data sharing plan



Emerging Entrants in Flight Plan 21

Commercial Space/Airspace

- **Efficiency of commercial space integration into the NAS**
 - Develop application processes, conduct gap analysis on data provided and data needed, improve mission planning processes
- **Increase automation for mission and operational planning**
 - Develop alternate means of message transmission, transition manual coordination to automated platforms
- **Launch site activation feasibility analysis**
 - Develop data, planning tools
- **Upper Class E integration for new and existing users**
 - Gap analysis in existing regulations, forecasting across Upper E airspace



Medical Certification for Evolving Aircraft Operations

Identifying necessary medical standards to ensure an acceptable level of public safety across the range of continuously changing aircraft operations, from full automation to direct human control

- ✓ Advances in technology are changing the risk equation/challenging the applicability of current medical standards in all crewed scenarios, regardless of pilot location
- ✓ It is important to consider what risk level is acceptable in this evolving, global system — must accommodate both legacy aircraft operations and operations dependent on rapidly advancing technologies
- ✓ International harmonization of risk-based medical standards is critical to ensuring global system safety
- ✓ Trained medical professionals are, and will continue to be, necessary as we consider the impacts that multiple or complicated treatments may have on the medical fitness of individuals in safety-critical positions in the system

For more information, the United States submitted an Information Paper during the 41st ICAO Assembly on this topic (https://www.icao.int/Meetings/a41/Documents/WP/wp_569_en.pdf)



Final Thoughts

Aviation ecosystem is undergoing once-in-a-lifetime transformation but our safety mission and partnership are constant

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APAC UCWG Meeting, Seoul, South Korea

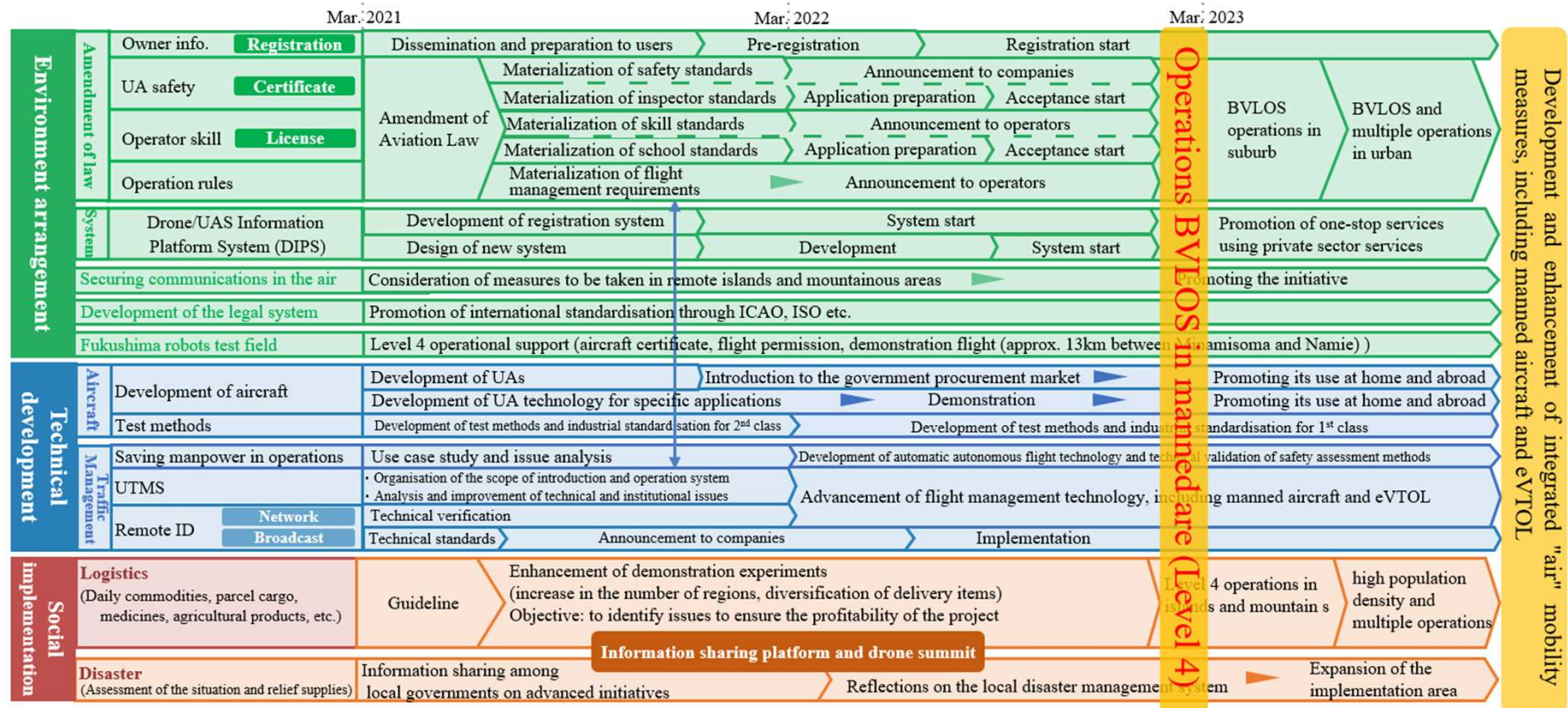
Japan Policy on BVLOS Operation for UAS

14 November 2022

Japan Civil Aviation Bureau

Japan Roadmap for UAS

- Japanese government has established a roadmap for UAS in collaboration with industry.
- Amendment to Civil Aeronautics Law will be effective on 5 December 2022, to establish rules including for BVLOS operation over people (Level-4).
- JCAB will further focus on UTM implementation.



Registration of UAS

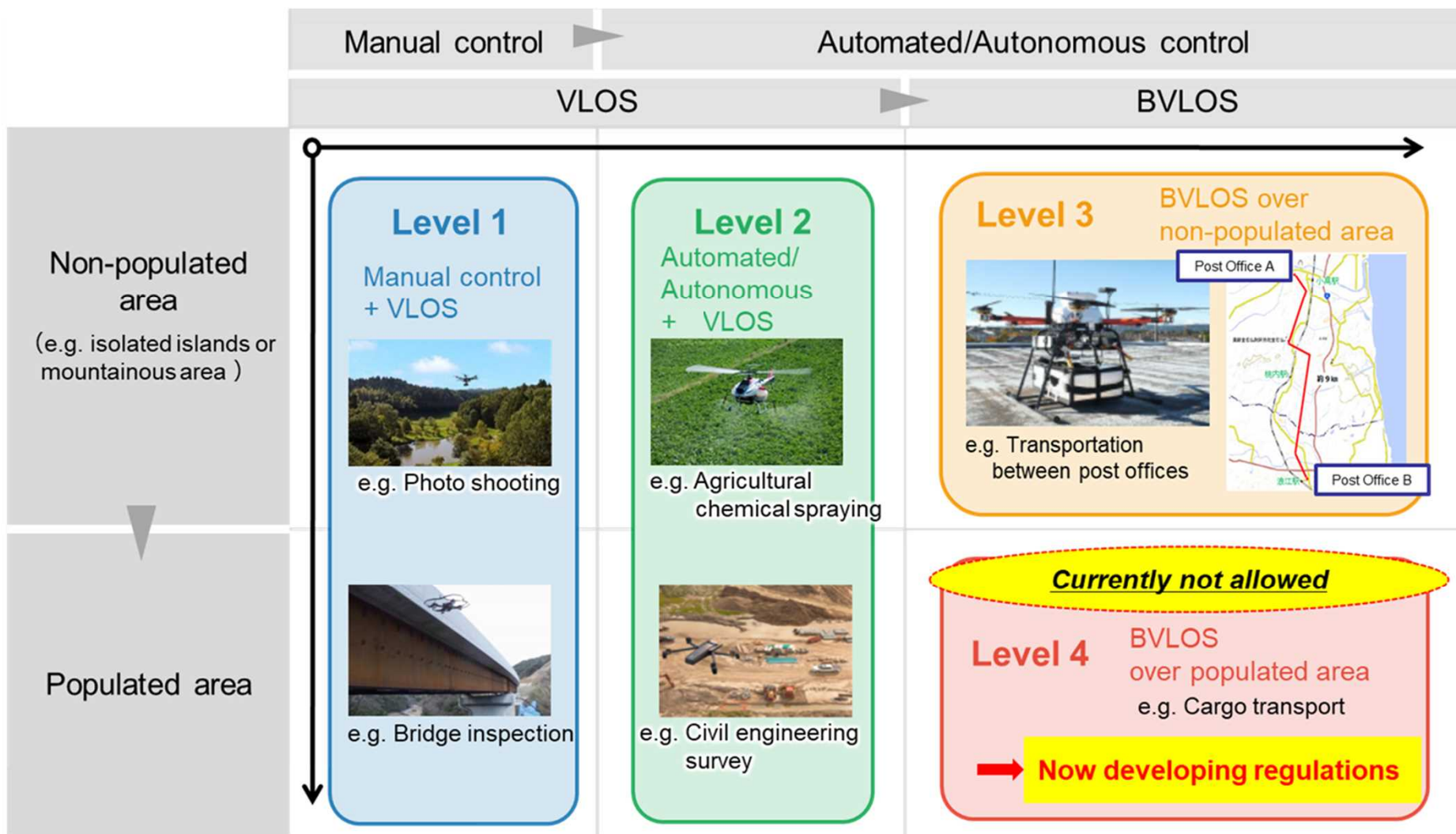
Since June 20, 2022, to ensure safety and security in the expanded use of Unmanned Aircraft System (UAS);

- **Registration** of UA has been mandated, and
- UA has to be marked with registration ID, as well as be fitted with **remote ID function**.

Objective is to manage owner information and exclude dangerous aircraft from airspace.



Category of UAS operation in Japan

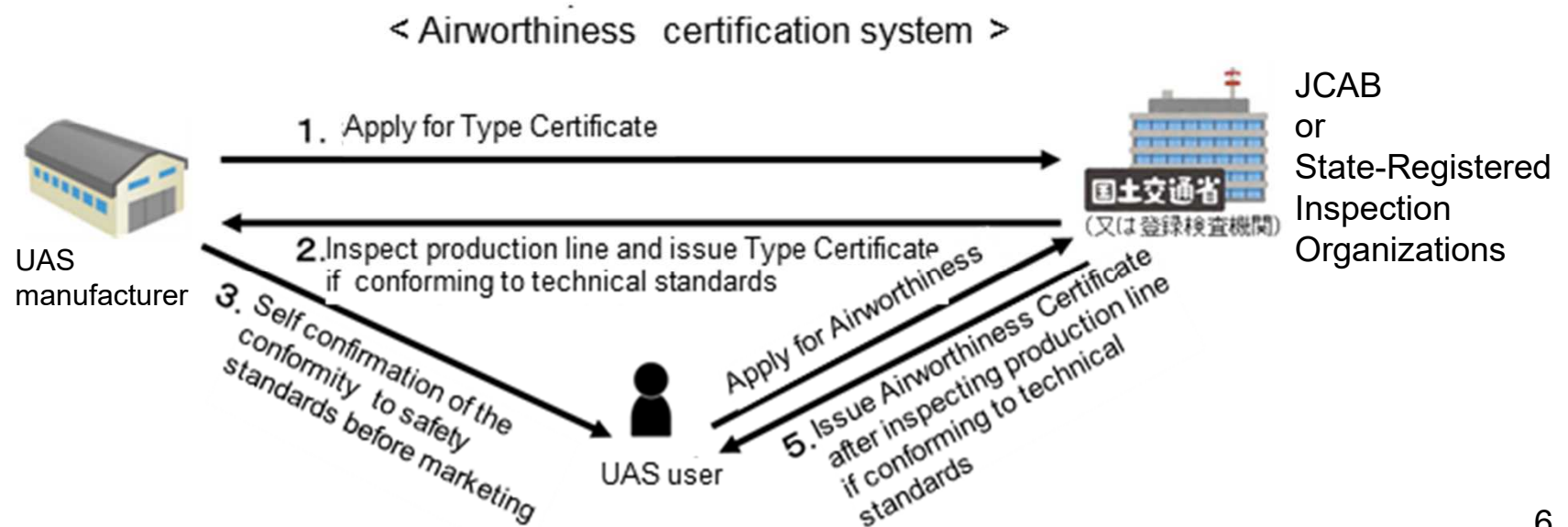


Amendment to Civil Aeronautical Law

- In order to realize the level 4 operation, Japanese government amended the Civil Aeronautics Law of Japan.
- Main amendments are to include rules for
 - Airworthiness,
 - Pilot Qualification, and
 - Rules of Operation.
- Detail regulations are now under development.
- Effective date: 5 December 2022

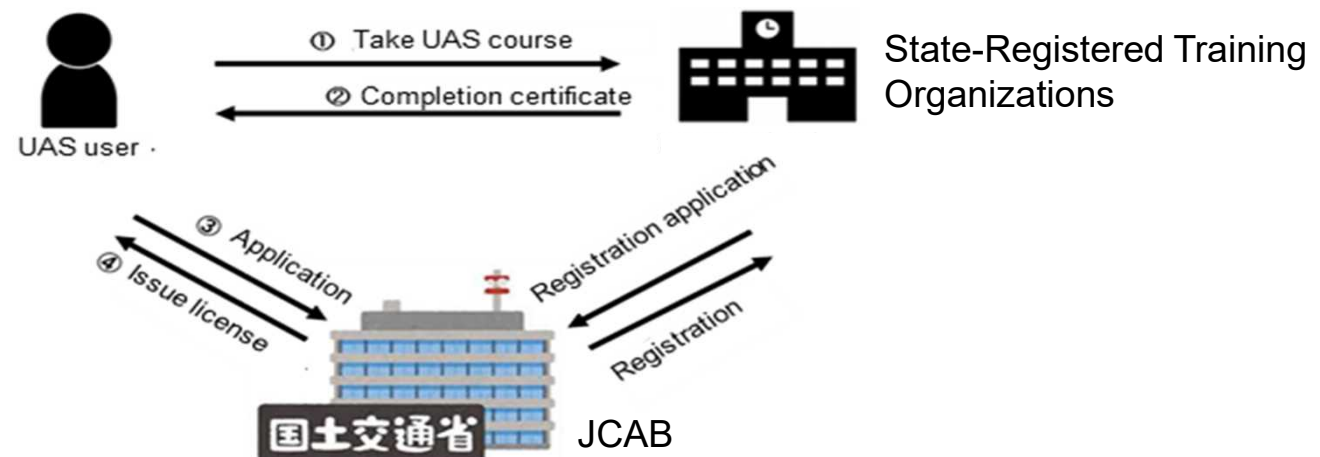
Rules for Airworthiness

- **Airworthiness certificate system** for individual UAS is established.
- If an UAS manufacturer obtains **Type Certificate**, the inspection of airworthiness certificate for individual UAS will be partially omitted.
- Two types of certificates:
 - Type 1 Airworthiness (Type) Certificate (Level 4)
 - Type 2 Airworthiness (Type) Certificate (Level 1-3)
- **State-Registered Inspection Organizations** are granted to conduct inspections for airworthiness on behalf of JCAB



Rules for Pilot Qualification

- **Pilot Qualification System** is established.
- Two classes of license:
 - Class 1 Pilot License (necessary for the flight over people),
 - Class 2 Pilot License
- Limitations are specified depending on the aircraft type (fixed or rotary wing) and flight methods (BVLOS, etc).
- **State-Designated Testing Organizations** may conduct Pilot License examination.
- All or part of examination may be exempted, if applicants have completed UAS training course at **State-Registered Training Organizations**.

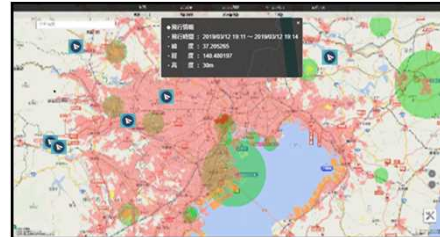


Rules for Operations

- Flight permit is required each time when operating over people.
- As a common rule, UAS operator must;
 - ✓ report flight plan;
 - ✓ keep UAS logbook; and
 - ✓ report accident and incident, if any

Report Flight Plan

Report flight path, date, height, information of pilots, etc.



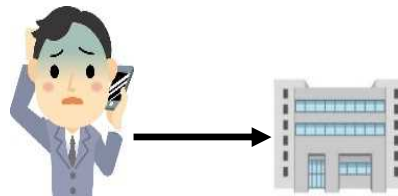
Keep UAS logbook

Keep maintenance log, flight time, etc.



Report accidents and incidents

Report serious injuries, etc, if it occurs



Urgent Aid

Responsible for urgent aid



APAC UCWG Meeting, Seoul, South Korea

JCAB Policy on Registration and Tracking

14 November 2022

Japan Civil Aviation Bureau

1. Background

Background - Registration of UA

Since June 20, 2022, to ensure safety and security in the expanded use of Unmanned Aircraft System (UAS);

- **Registration** of UA has been mandated, and
- UA has to be marked with registration ID, as well as be fitted with **remote ID function**.

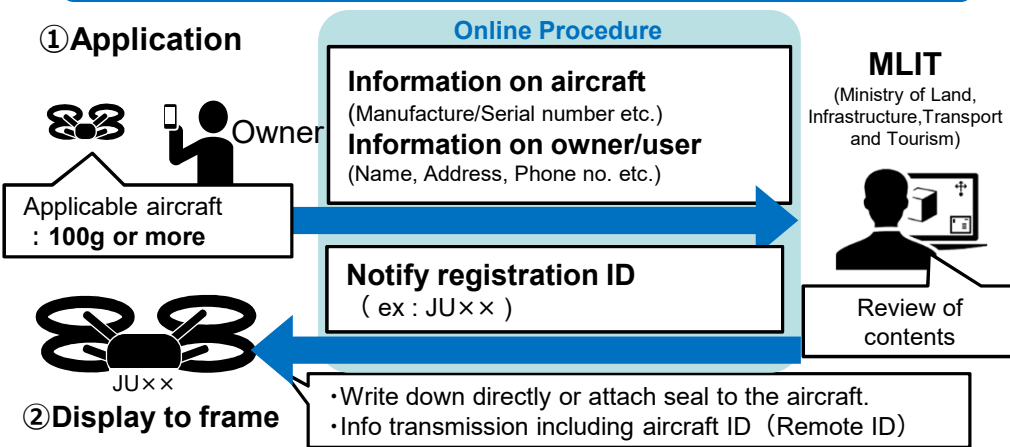
Objective is to manage owner information and exclude dangerous aircraft from airspace.



Background – Scheme and Dissemination of Registration System

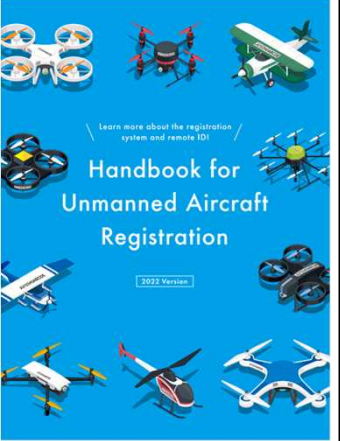
- Approximately 310,000 aircrafts has been registered by the end of this October.
- Posters and leaflets were published on web site and disseminated in events.

Process of the Registration System



Activity on dissemination:

- Publish posters and leaflets to disseminate the mandate of registration
- Publish leaflets on MLIT website and hand out them in public events.
- To ensure registration, request cooperation from home electric appliances retailers and web stores.

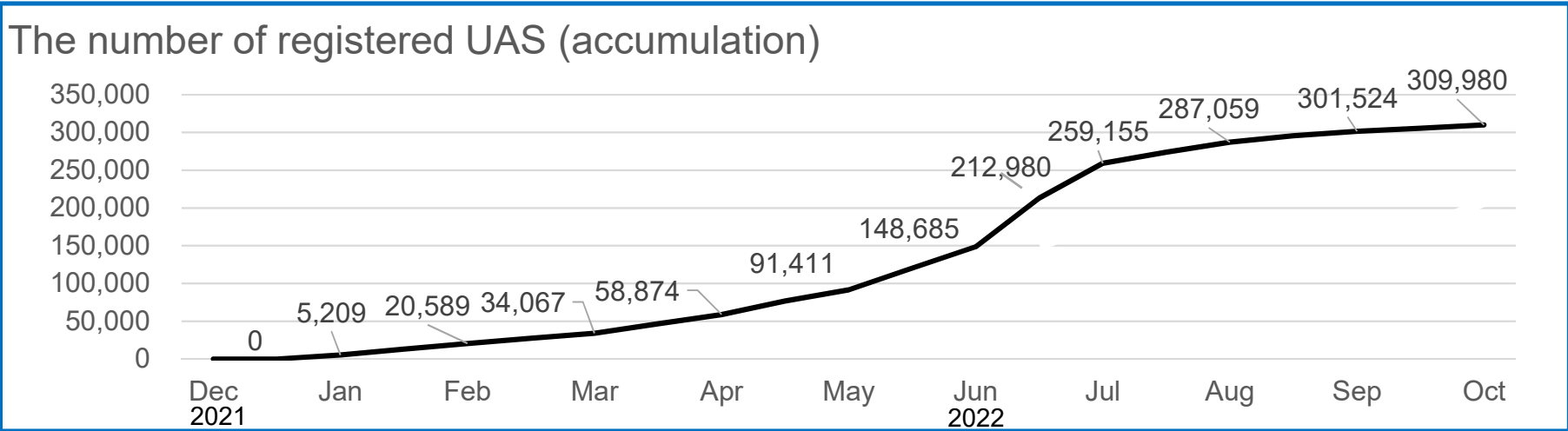


Learn more about the registration system and remote ID!

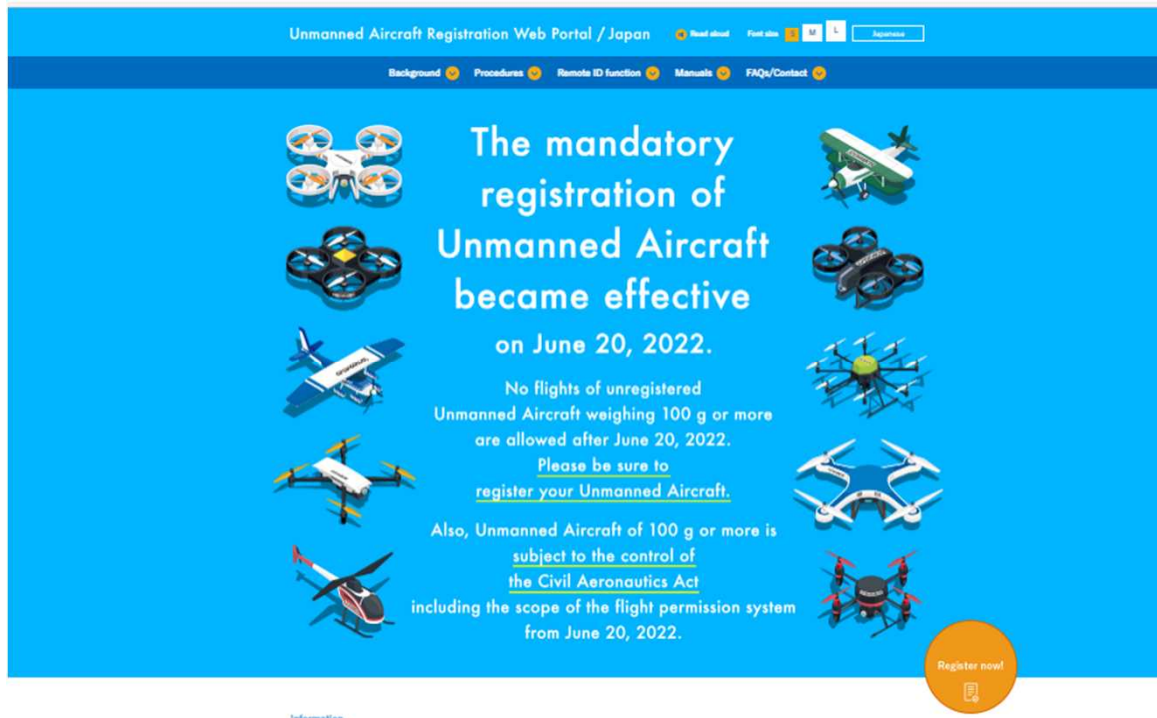
Handbook for Unmanned Aircraft Registration

2022 Version

Ministry of Land, Infrastructure, Transport and Tourism

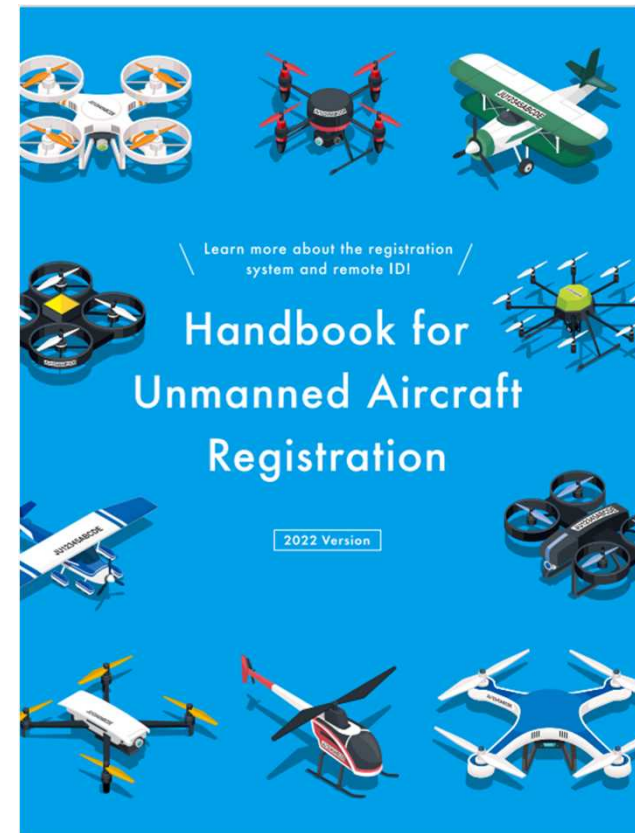


Background – Dissemination of Registration Regulation



Web site

<https://www.mlit.go.jp/koku/drone/en/>



Ministry of Land, Infrastructure, Transport and Tourism

Handbook

2. Remote Identification (Remote ID)

Remote ID – Remote Identification Regulation

- Japanese Civil Aviation Bureau (JCAB) started to mandate basically all UAS to identify remotely, from 20th June 2022, based on Civil Aeronautics Law of Japan.
- In principle, all of the mandatory-registered aircrafts* shall be equipped with Remote ID, for example, Multicopter, Single-rotor, Fixed wing etc. *100g or more are subject to registration



Multicopter



Single-rotor

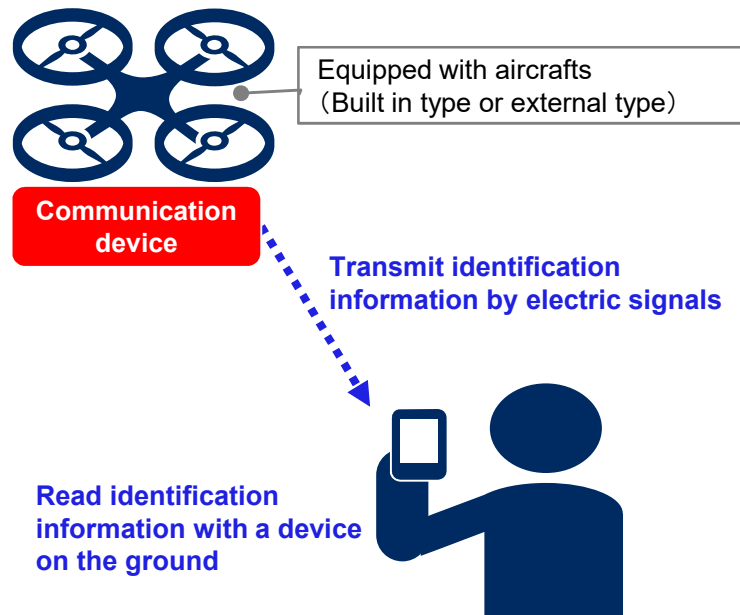


Fixed wing



Hobby use

Schematic of Remote ID



(Note) Remote ID is not required for flights submitted as test flights for research and development etc.

Exemption

① Transitional term

Unmanned Aircrafts registered during the pre-registration period (20th Dec in 2021 ~ 19th Jun in 2022)

② Law enforcement agency

Flights for operations requiring special confidentiality, for example, flown by the National Police Agency, Japan Coast Guard.

③ Moored Aircrafts

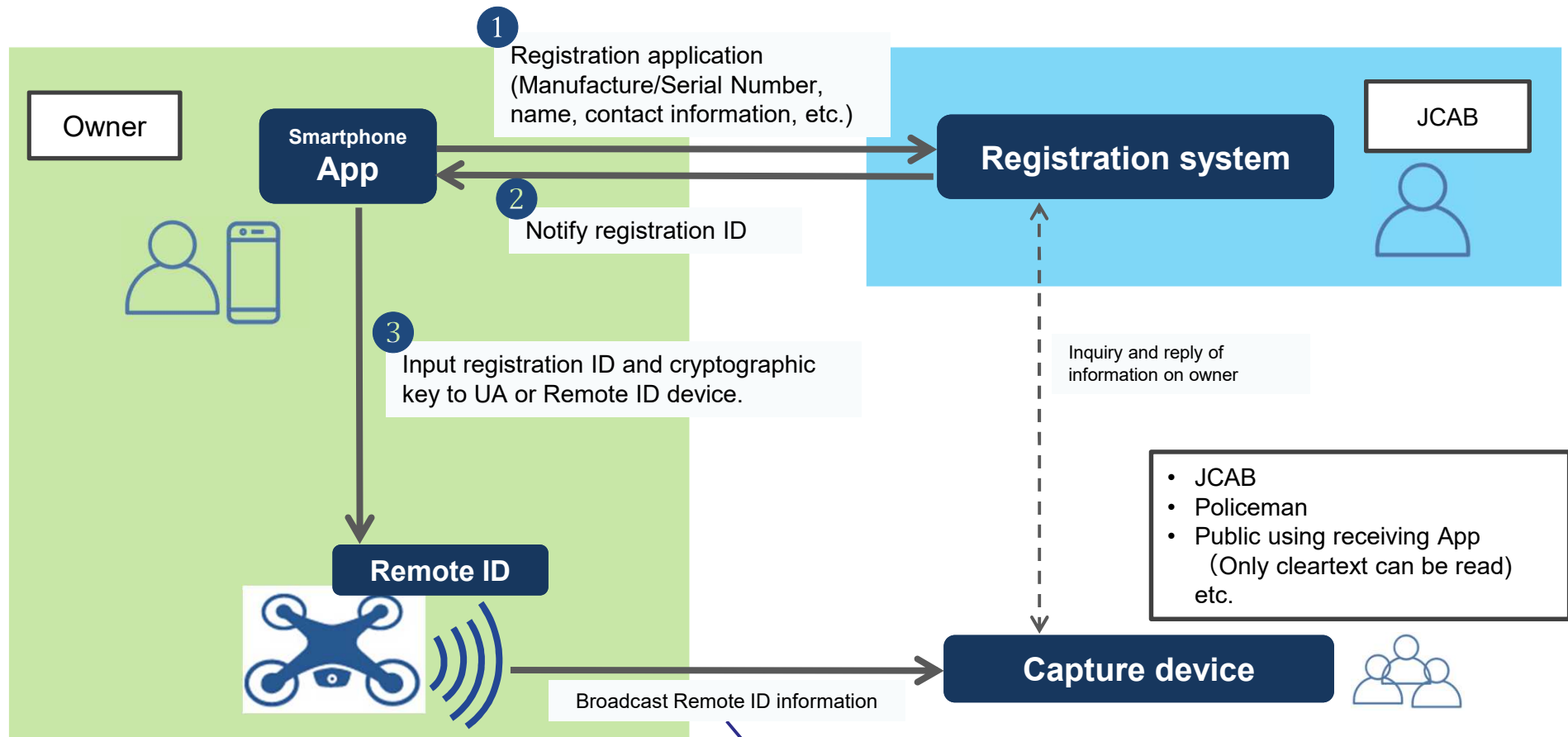
Flown moored with a sufficiently strong string, etc. (not exceeding 30m in length)

④ Specific Area

Flights over a specific area notified in advance to the government, with necessary measures taken.



Remote ID – System Configuration



Messages:	Registration ID, Serial Number, Location/Vector, Timestamp, Authentication Data
Update rates:	Once every second
Transmission protocol:	Bluetooth 5.x Long Range, Wi-Fi Aware, Wi-Fi Beacon

- JCAB established “Direct Remote ID technical notice” by June 2021, as a requirement to comply with the law.
- In principle, “Direct Remote ID technical notice” is in conformity with ASTM F3411-19.

“Direct Remote ID technical notice”

▪ 3. Data format of RID signal

The RID signal shall be transmitted in accordance with 5. Performance Requirements in ASTM International F3411-19 "Standard Specification for Remote ID and Tracking" (hereinafter referred to as "ASTM standard"). In the ASTM standard, the items marked Mandatory are must be included in the RID signal, while the items marked Optional are do not necessarily have to be included in the RID signal. However, the following items shall be subject to the following requirements.

(1) For Basic ID Message, both of the following shall be transmitted.

- The registration ID notified under the provisions of Article 131-6, paragraph (3) of the Civil Aeronautics Act (ID type = 2)
- The serial number specified by the manufacturer (ID type = 1)

(2) The Authentication Message must be transmitted as a required item.

The Authentication Type shall be A, and the message authentication code generated according to the following shall be used as Authentication Data.

Remote ID – Concept (2)

- Key differences between the technical notice and ASTM are described as follows.

	Key differences	Rationale
Messages (ID)	<u>Both Registration ID and Serial Number</u> are required	<ul style="list-style-type: none"> - Registration ID may be entered into UAs or remote ID modules that are not registered to JCAB. - Serial number may be duplicated because a remote ID module can be attached to several UAs.
Messages (Authentication)	<u>Mandate to broadcast Authentication Message.</u> AES-128bit-CMAC and Authentication Type A are use.	Anti-spoofing
Update Rates	At least <u>once a second for both dynamic and static message.</u>	Does not have any meaning to change update rates between dynamic and static message because all messages are sent in a “message pack.”
Transmission Protocol	Require to use either Bluetooth 5.x Long Range*, Wi-Fi Aware or <u>Wi-Fi Beacon.</u>	Utilizing only Bluetooth legacy are not allowed because of its range.

* It is not mandated to broadcast via Bluetooth Legacy (4.x).

Remote ID – Remote ID and Capture Device



Dimensions : 60mm×30mm×22mm
Weight : About 33g



Dimension : 40×30×14mm
Weight : 12g



Dimensions : 40 x 40 mm
Weight : 8.5 g (External power)



Capture device (list)



Capture device (card)



**Federal Aviation
Administration**



AAM Safety Continuum

November 2022

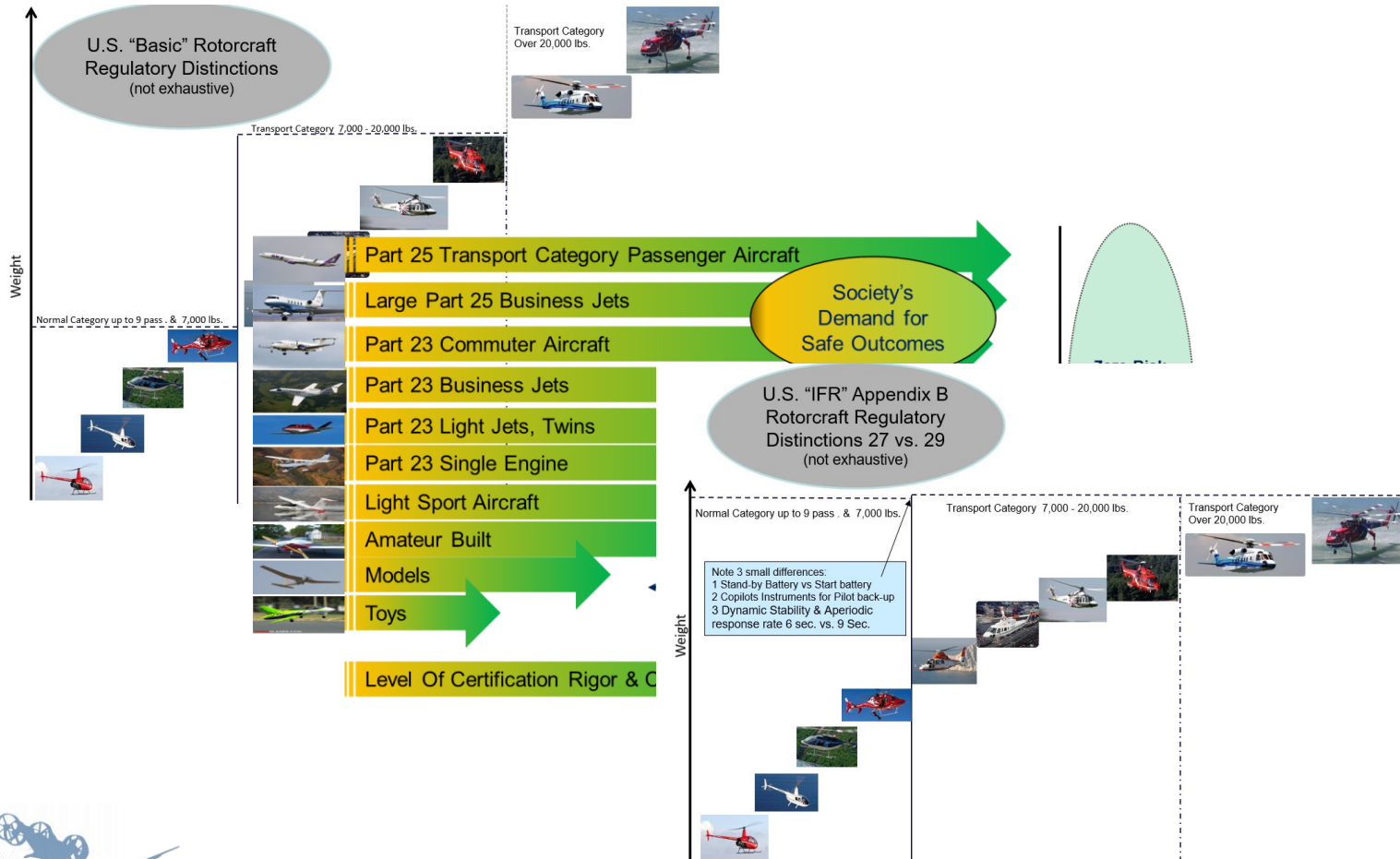


AAM Certification Strategy

- The FAA is taking a risk-based approach in certifying AAM aircraft
- AAM is not a single technology, but rather a collection of new and emerging technologies in aviation, particularly in new aircraft types
- This approach involves applying existing airworthiness standards where the risks posed are similar to traditional aircraft
- The FAA will utilize proven methods for ensuring the safety of complex systems



FAA Safety Continuum – Managing Risk/Resources



We are applying the Safety Continuum to the certification of AAM as well



Definitions

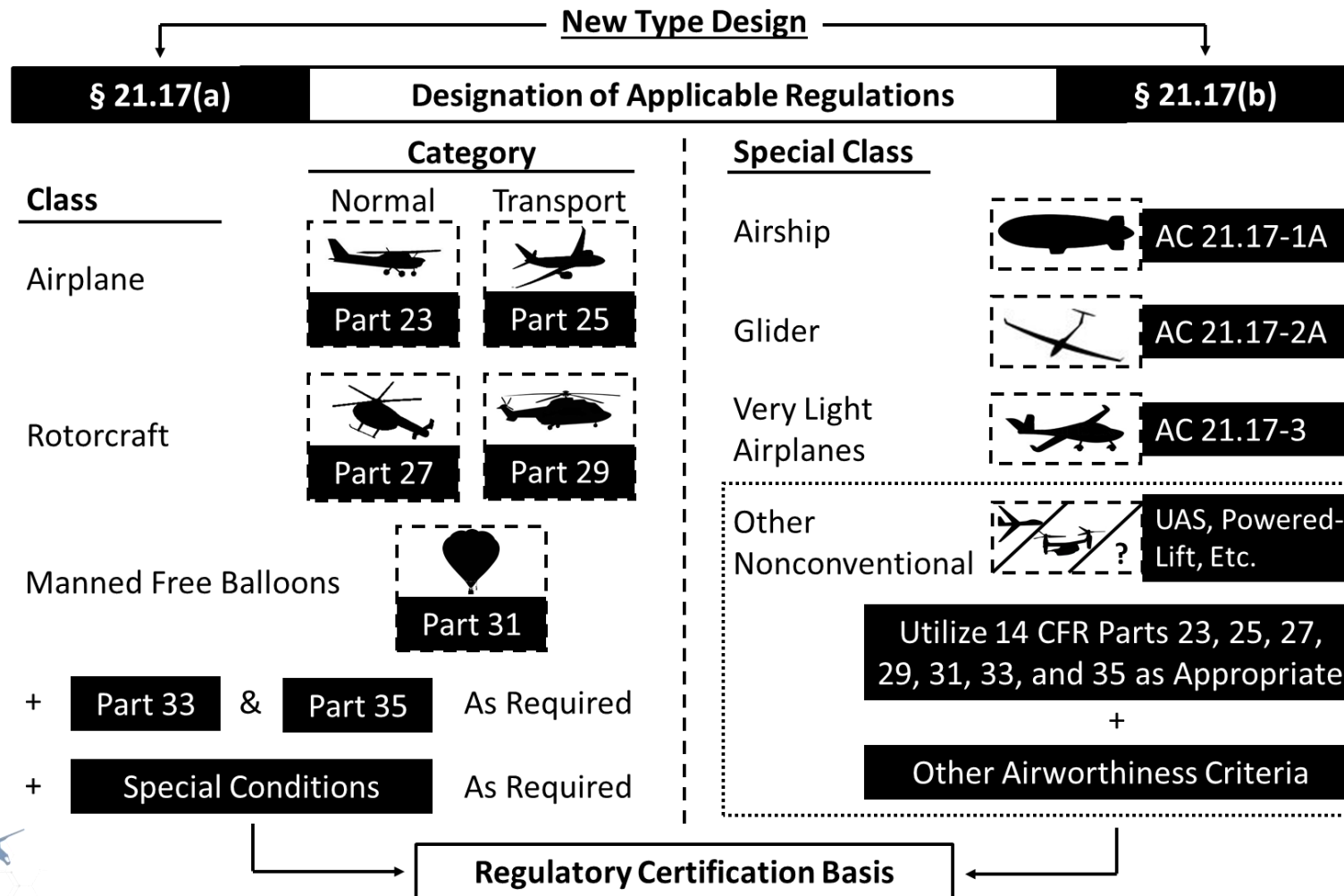
Airplane Powered-Lift Rotorcraft



- 14 CFR part 1 defines different aircraft classes:
 - **Airplane** means an engine-driven fixed-wing aircraft heavier than air, that is supported in flight by the dynamic reaction of the air against its wings
 - **Powered Lift** means a heavier-than-air aircraft capable of vertical takeoff, vertical landing, and low speed flight that depends principally on engine-driven lift devices or engine thrust for lift during these flight regimes and on nonrotating airfoil(s) for lift during horizontal flight
 - **Rotorcraft** means a heavier-than-air aircraft that depends principally for its support in flight on the lift generated by one or more rotors



Designation of Applicable Regulations



As shown by the use of §21.17(b) for VLA, the FAA has broad ability to utilize special class where it is prudent



Designation of Applicable Regulations

§ 21.17(b) - For special classes of aircraft, including the engines and propellers installed thereon (e.g., gliders, airships, and other nonconventional aircraft), for which airworthiness standards have not been issued under this subchapter, the applicable requirements will be the portions of those other airworthiness requirements contained in Parts 23, 25, 27, 29, 31, 33, and 35 found by the [FAA] to be appropriate for the aircraft and applicable to a specific design, or such airworthiness criteria as the [FAA] may find provide an equivalent level of safety to those parts. [Amdt. 21-92]

- Allows the FAA to tailor the certification basis for each product
- Can include
 - FAR's (14 CFR Parts 23, 25, 27, 29, etc.)
 - Other airworthiness criteria



Leveraging Existing Framework

14 CFR part 23 amendment 64 [23-64] became effective in 2017 and accomplished many goals:

- Creating a regulatory regime that applies an appropriate level of certification rigor commensurate to posed risk
- Setting safety objectives that foster innovation and technology adoption
- Replacing prescriptive rules with performance-based regulations
- Using consensus standards to clarify how safety objectives may be met by specific designs and technologies

The move to performance based regulations has enabled the FAA to more effectively manage the revolution in air vehicles and serves as the baseline for AAM certification

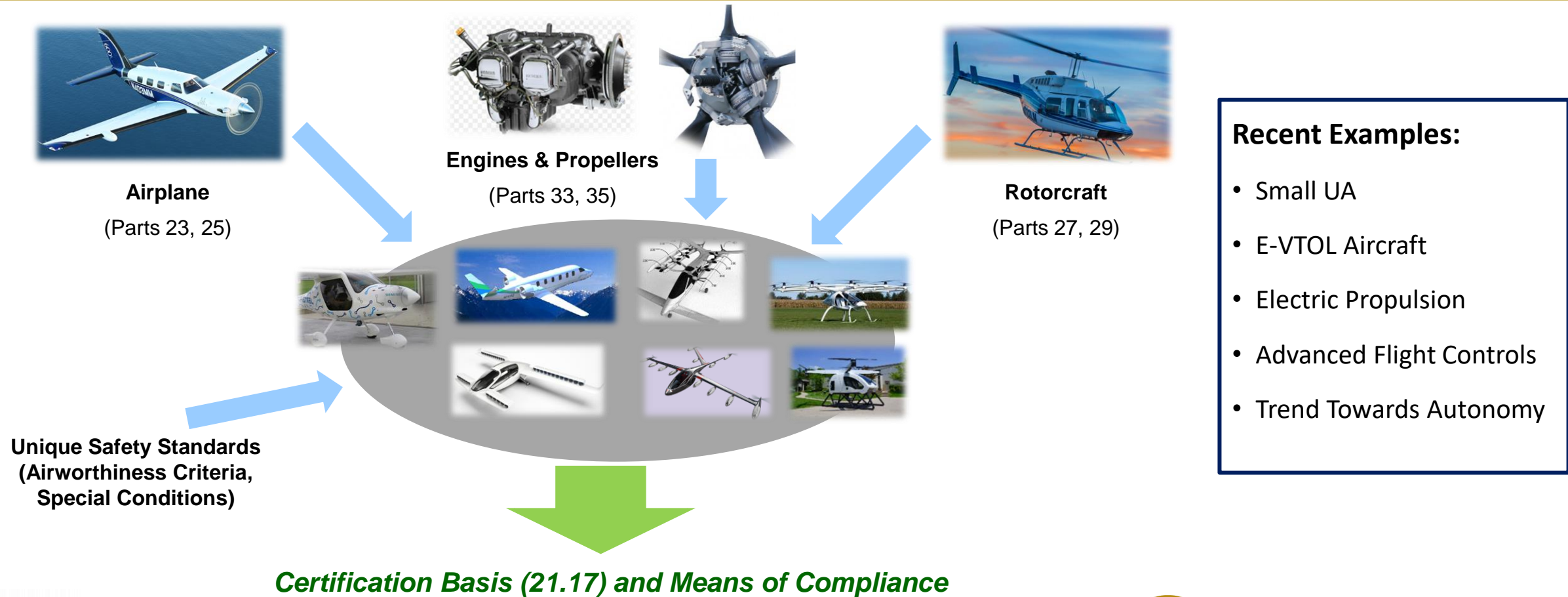


Foundational Requirements

- The FAA currently has AAM projects that are powered-lift, and others that are rotorcraft
 - Both are being certified under §21.17(b) as special class aircraft
 - Existing projects that were started as §21.17(a) are having their certification basis updated accordingly
- The performance-based requirements of [23-64] serves as the foundation of AAM certification and the requirements are being utilized as airworthiness criteria
- [23-64] is being supplemented with additional airworthiness criteria for novel design features not considered in the airworthiness standard, such as VTOL capability



Tailoring Certification Requirements



Accepted Means of Compliance

- A key tenet of the FAA's approach to AAM certification is that the MOC must be accepted by the FAA
- §23.2010 requires that an applicant must comply using a means of compliance accepted by the FAA
- MOC's acceptable for traditional part 23 airplanes may not be appropriate for AAM due to configuration differences, complexity, and novel technologies



Means of Compliance for AAM

- In [87 FR 13911](#) (March 11, 2022), the FAA accepted F3261-21 as an acceptable means of compliance with identified changes
- In addition to identified changes, the Notice of Availability (NOA) also clarifies:

“Depending on the details of a design, the applicant may require use of a different means of compliance beyond those accepted by this document. For example, novel airplane designs, such as unmanned airplanes or vertical takeoff and landing airplanes, may be outside the scope of this document, and applicants may need to propose alternative means of compliance applicable to their designs accepted under § 23.2010.”



Acceptable Level of Safety for AAM

- An example of where FAA has established that the general part 23 NOA is inappropriate for AAM is for System Safety and Systems & Equipment
 - In [87 FR 13911](#) (March 11, 2022), the FAA established that F3061/F3061M-20 and F3230-21a are an acceptable means of compliances conventional part 23 airplanes with some caveats
- The FAA has made the determination that the allowable quantitative probabilities in Table 5 of F3230-20a and the DAL requirements in Table 2 of F3061/F3061M-20 are inappropriate for some fly-by-wire systems for AAM for lower level aircraft
 - Some proposals are highly complex and blend functions that are traditionally federated
 - Flight control systems that blend propulsion and control surface deflection for aircraft that are not positively or aerodynamically stable may necessitate higher requirements



AAM Airworthiness Criteria

- On November 8, 2022, the FAA published proposed airworthiness criteria for the Joby JAS4-1 aircraft
- This proposal is the first proposed criteria for a powered-lift AAM aircraft from the FAA
- Comments must be received by December 8, 2022

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 21

[Docket No. FAA-2021-0638]

**Airworthiness Criteria: Special Class
Airworthiness Criteria for the Joby
Aero, Inc. Model JAS4-1 Powered-Lift**

AGENCY: Federal Aviation
Administration (FAA), DOT.

ACTION: Notice of proposed
airworthiness criteria.



Looking Ahead

- The FAA is utilizing current projects to establish the groundwork for future published policy and rulemaking
- This is a holistic effort, the FAA is coordinating the development of certification requirements with airspace, infrastructure, and operational requirements





CAAC UAS & AAM
Certification Policy
Presentation

BY CUI YULLANG
AIRCRAFT AIRWORTHINESS CERTIFICATION
DEPARTMENT, CAAC
18/NOV/2022



Content

1

- **Airworthiness Certification of UAS and AAM in China**

2

- **EHang EH216-S Certification Project Practice**



Advanced Air Mobility

- **New Aviation EcoSystem ;**

- **Need Change in many fields;**
 - **Airspace management**
 - **Operational rule**
 - **Vertiport**
 - **Aircraft**

 -



Advanced Air Mobility

➤ Principle

- Oriented to operation scenarios
- based on operation risk
- implemented classified management

➤ Test Operation:





UAS/AAM Operation Test Area

- The site selection of the test area shall consider the uniform distribution of North-South and East-West to ensure its diversity
 - Different scenarios and applications
 - Different geographical environment
 - Different climatic environment
 - Different flight infrastructure



1. Airworthiness Certification of UAS in China

legislation



1. Airworthiness Certification of UAS in China

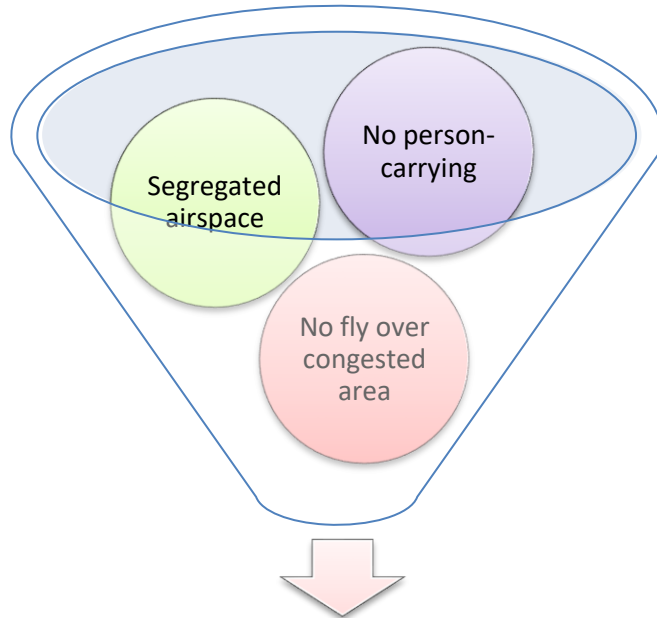
➤ **Principles of UAS Airworthiness Certification**

- ✓ **Classification based on risk**
- ✓ **Focusing on the system**
- ✓ **Airworthiness standard**

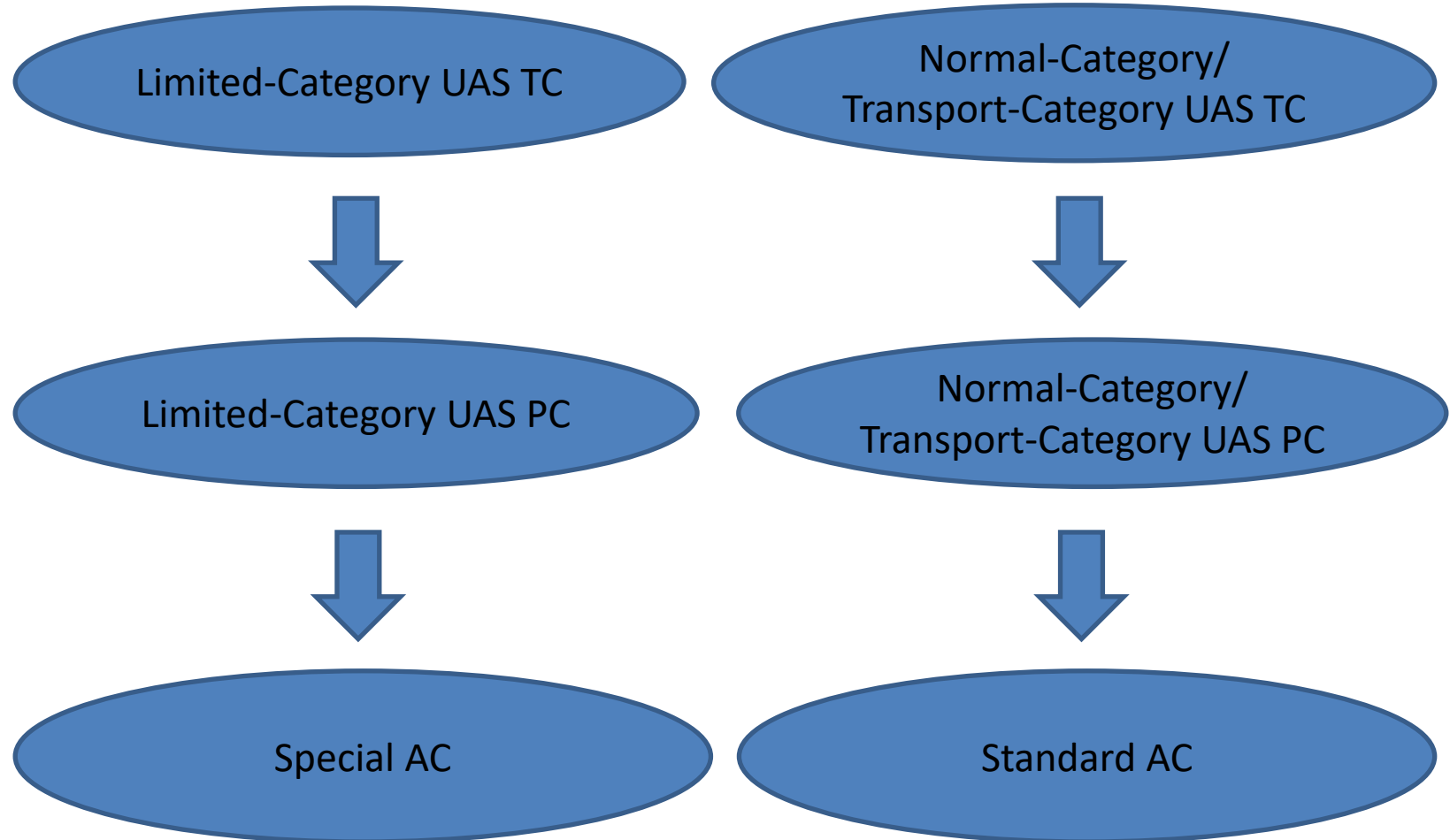


1. Airworthiness Certification of UAS in China

Policy



Limited-Category UAS



1. Airworthiness Certification of UAS in China

Project Practice



HY-100



T16/T20



FH-98



CH-4B



WL-2



EH216-S



V2000CG

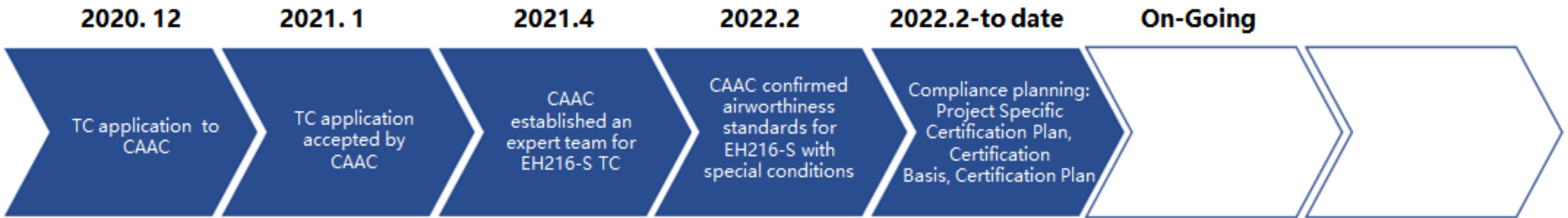


JDX-500



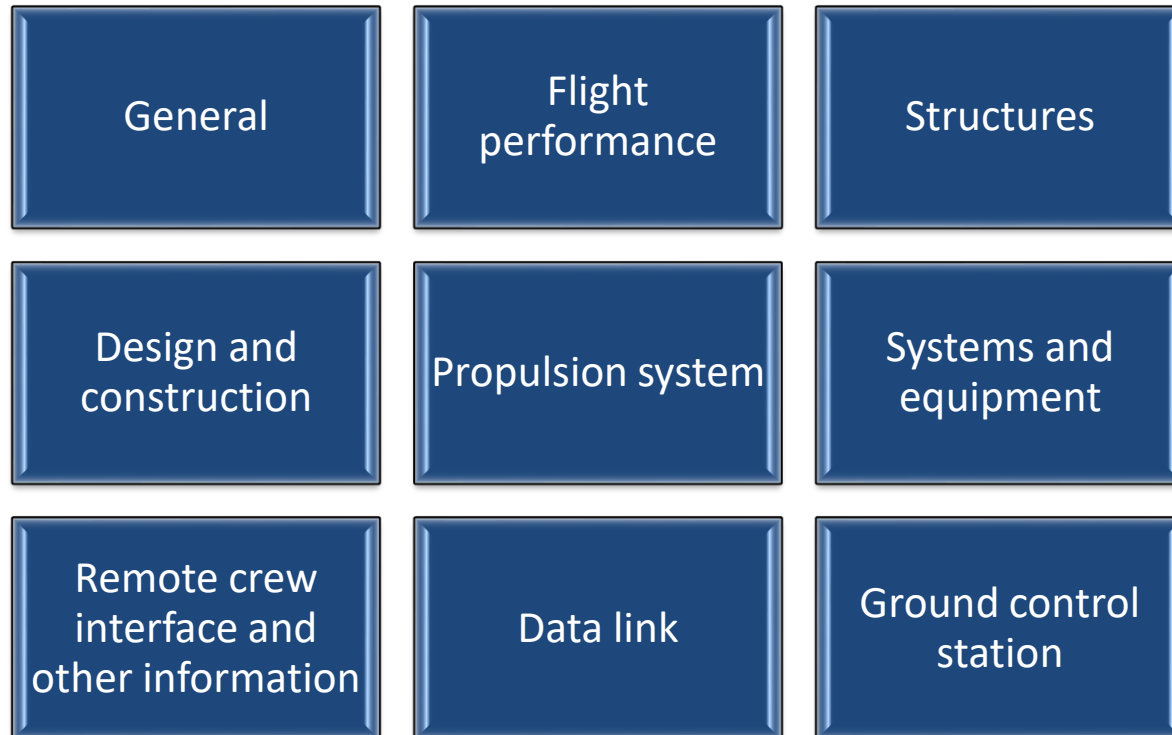
2. Ehang EH216-S Certification Project Practice

First Type Certification (TC) Project of Person-Carrying UAS in China



2. Ehang EH216-S Certification Project Practice

Special Conditions for EH216-S



中国民用航空局
Civil Aviation Administration of China

首页 新闻中心 信息公开 办事大厅 互动交流

主题分类: 专用条件和豁免
发文单位: 航空器适航审定司 发文日期: 2022-02-09
名称: 亿航EH216-S型无人驾驶航空器系统专用条件
文号: SC-21-002 有效性: 有效

亿航EH216-S型无人驾驶航空器系统专用条件

来源: 中国民航局 字体: 大 | 中 | 小 打印本页 分享到:

附件:
[亿航EH216-S型无人驾驶航空器系统专用条件.pdf](#)



2. Ehang EH216-S Certification Project Practice

Certification Plan

12
Specialties

- 1) Performance and Flight
- 2) Structures
- 3) Design and Construction
- 4) Electrical Systems
- 5) Lift/Thrust System Installation
- 6) Flight Control System
- 7) Ground Control Station
- 8) Data Links
- 9) Airborne Human-Machine Interaction
- 10) General
- 11) Continuous Airworthiness
- 12) System Safety



Challenges for Airworthiness Certification

- The power source of EH216-S is batteries. The thermal management, performance release and system management of the power battery system need to be strictly tested and verified.
- Distributed-electric propulsion system is in an exploration stage. There is no mature experience for CAAC and EHang to use for reference.
- EH216-S is the first person-carrying UAS/AAM TC project in China. Both CAAC and EHang need to study and explore the airworthiness requirements and methods of compliance, so as to determine the acceptable level of safety.
- The safety level of EH216-S UAS should reach the level of manned aircraft, and special attention should be paid to the function and safety of the automatic flight control system. As a person-carrying UAS system, it puts forward higher airworthiness requirements than general UAS for the reliability and safety of data link, as well as the communication, command, control and monitoring of aircraft by the remote crew in the ground control station.



Thank you for your attention!

