

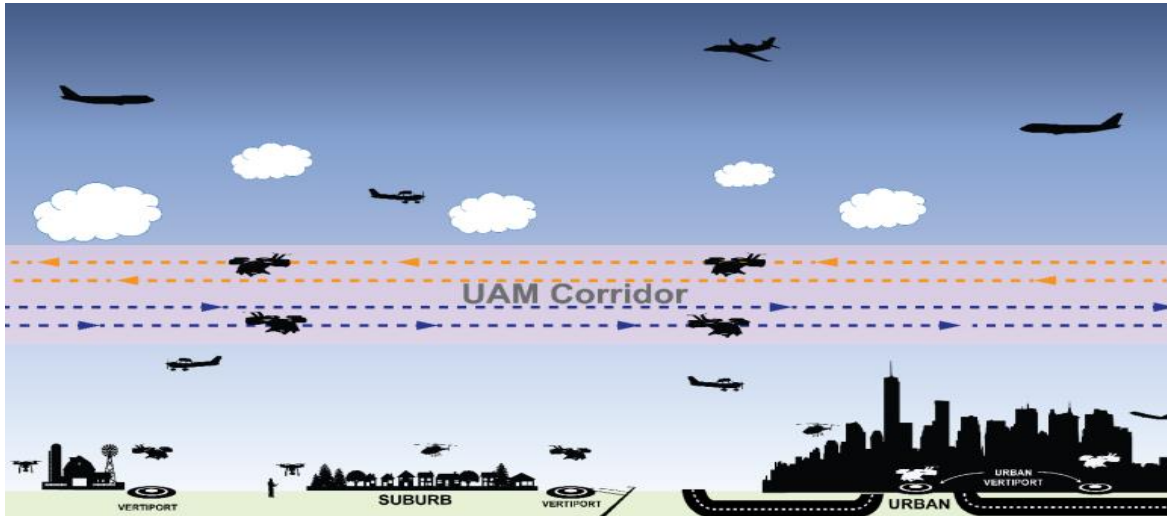
**Legal Mind on Airspace Integration :
Adoption, Change and “What We Should Do”**



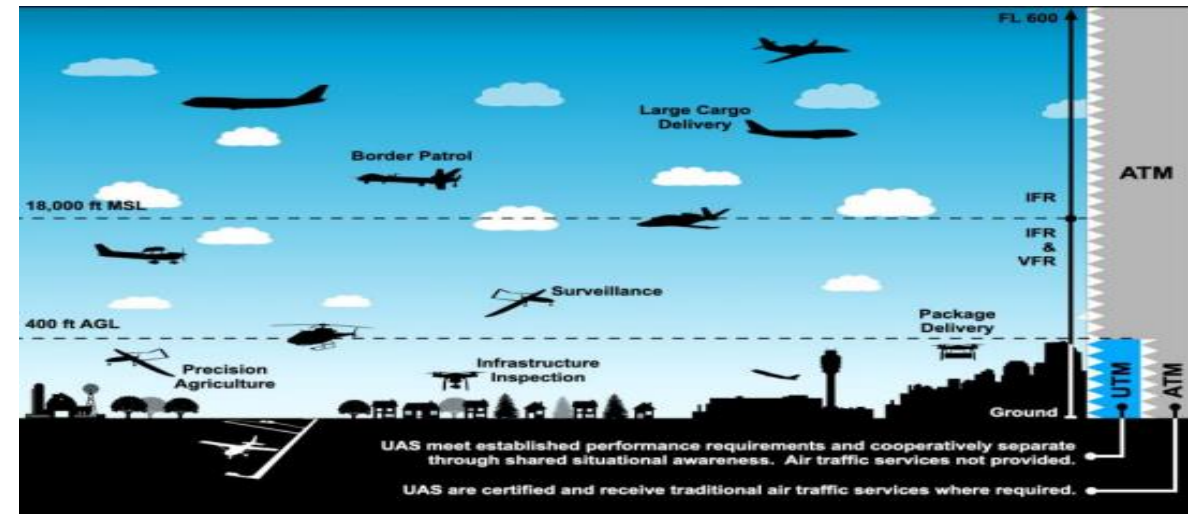
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The advent of New Air Mobility (AAM, UAM, UAS)

- The introduction of New air mobility creates some critical matters.
 - Aircraft (eVTOL, UA, sUA), Aerodrome (Vertiport, Land), Aviation (Corridor, AAO)
- Most of all, It causes the serious concerns about safe operation from people.
 - According to EASA's "Study on the societal acceptance"(2021), People's most concerns about New Air Mobility are Safety.
- Airspace Integration will be the first step to deal with this Safety matter.



[UAM Operation in Airspace]



[UAS Operation in Airspace]

What is Airspace Integration ?



- Airspace integration means when a New Air Mobility is introduced to airspace, to make Sure that it can operate safely under the existing airspace management system.

Minimal Additional
Infrastructure & workroad

Minimal Additional
Burden to Airspace users

Operation under Current
Airspace regulation

- Integration of UAM aircraft and operations into the airspace system will require them to be safe, efficient, and predictable, with minimal impact on existing airspace operations. This does not necessarily mean that UAM flights will be required to completely avoid other flights; the full breadth of aircraft and operations must be supported equitably.

Legal Approach to Airspace Integration



- Derivation and analysis of possible legal issues arising from the operation concept of New Air Mobility under the current Airspace regulation regime

➔ **Contribution to the evolution of Operation Concept by providing feedback to the Current Operation Concept**

- Application of new Air Mobility Operation Concept to the domestic airspace law system

➔ **Changing or creating regulations to operate New Air Mobility safely considering each state's airspace environment, including setting new Special Use Airspace**

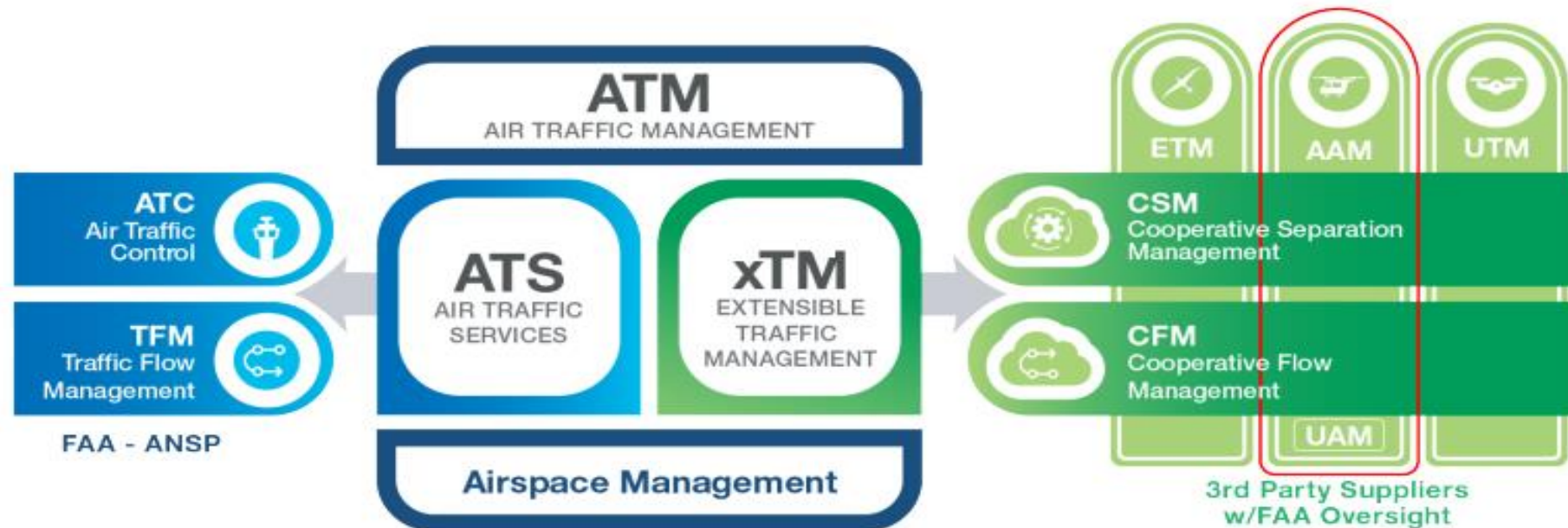
- Creation of Global model norms applicable to each state's airspace law system

➔ **Researching the pros and cons of each state's regulations, verifying the operation status and providing Global model norms for states introducing New Air Mobility**

Urban Air Mobility, Concept of Operation (FAA V 2.0)



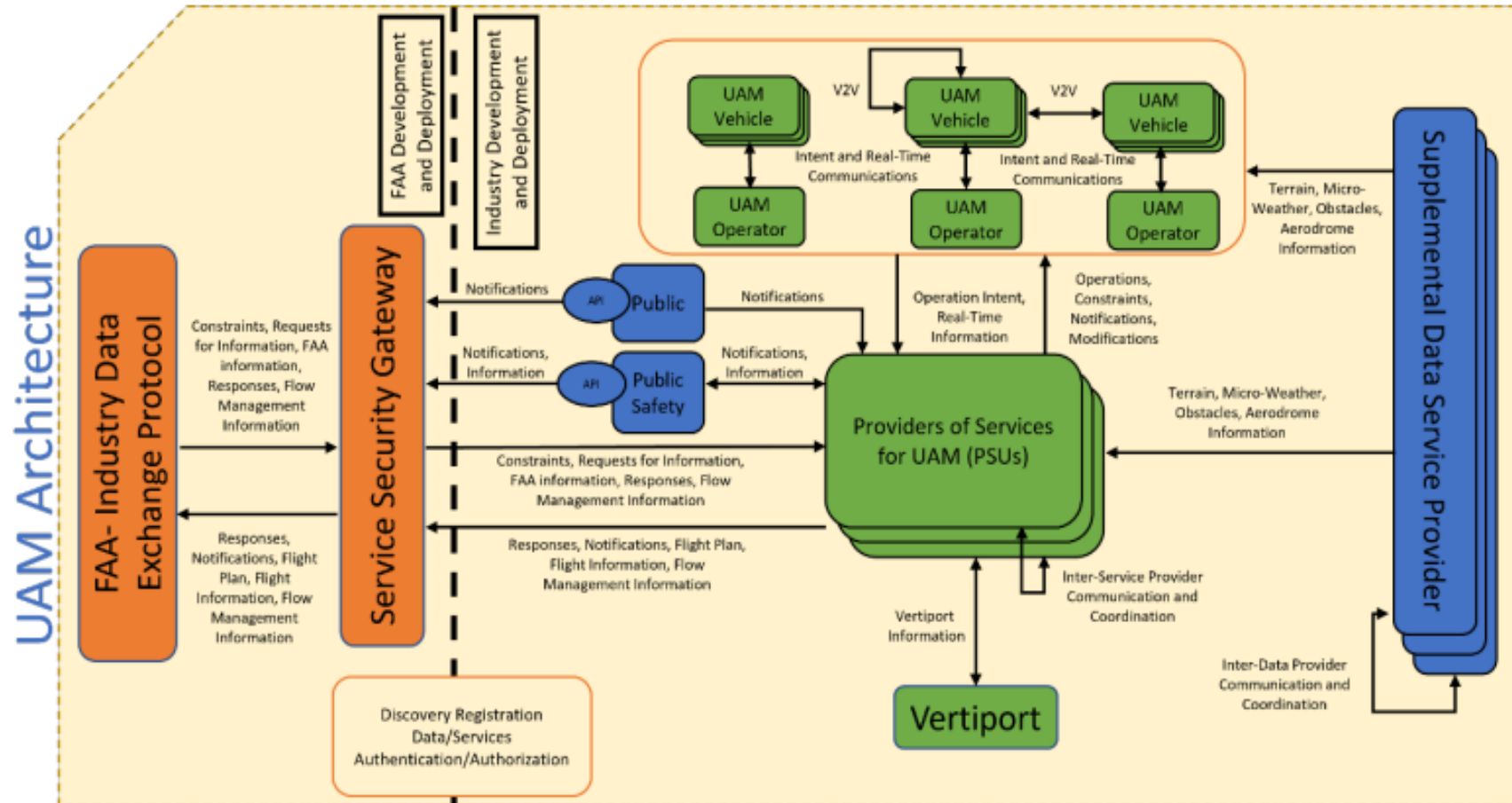
- Incorporation of Airspace Integration → **"Segregation, Adaptation, Change"**
 - Segregation** → (Altitude Scope 1,000 ~2,000 ft, Establishment of UAM Corridor)
 - Adaptation** → (Subject to the rules of Airspace Classification, Class "B", "C", "D", "E")
 - Change** → (The evolution of Regulatory Framework for UAM Airspace management)
- Airspace Management for UAM → **"UAM Cooperative Environment"**
 - Cooperative Service Environment of UAM Participants based on Information & Data Sharing



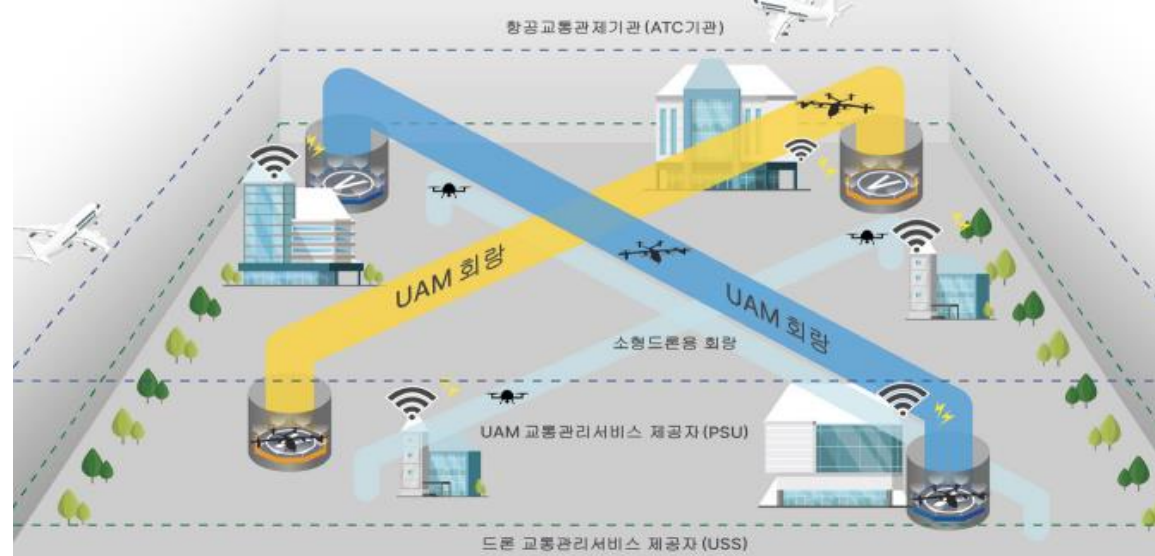
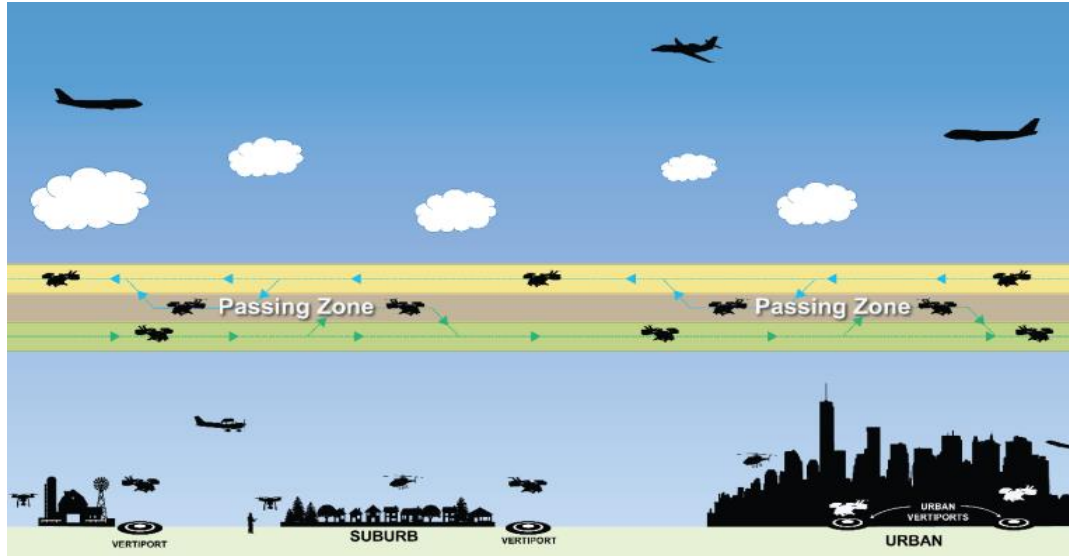
Roles and Responsibility of Participants (UAM Cooperative Environment)



- UAM Air Traffic Management : ATC → PSUs based on Information & Data exchange
Separation, Flow Management → PIC, UAM Operator Supported by PSUs in UAM Corridor
 → However, Still ATC in Controlled Airspace (Class "B", "C", "D")



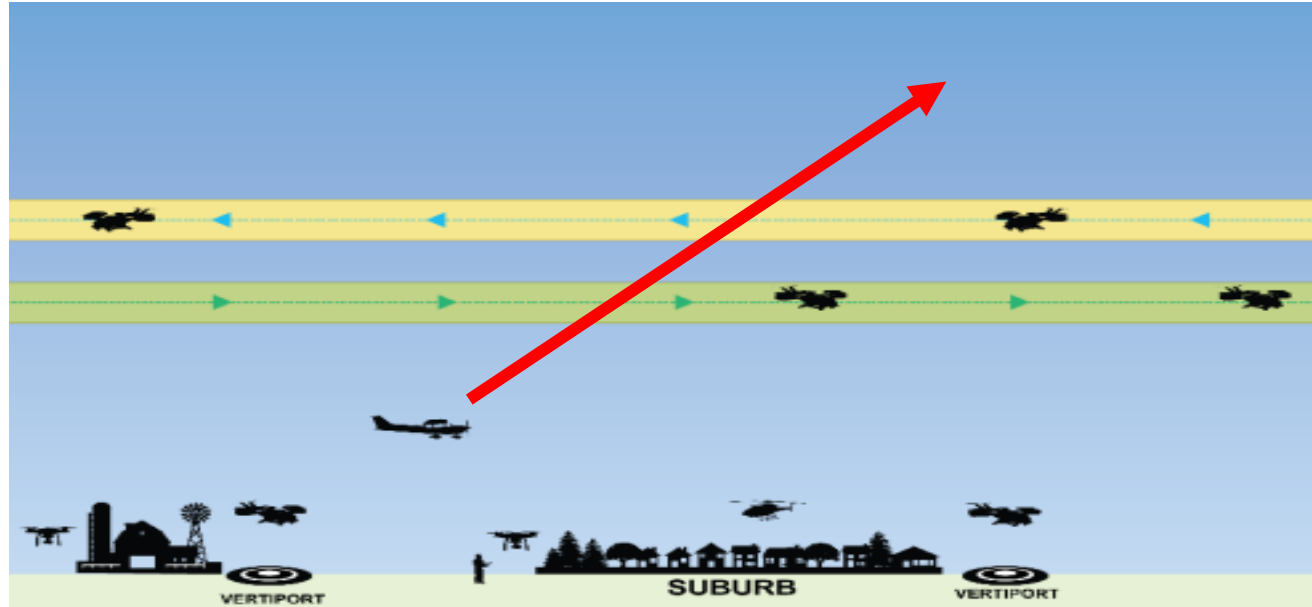
Legal Issues (1) - Who controls UAM Operation?



- In UAM Corridor, ATC does not provide air traffic service such as Separation.
- Who controls the UAM Operation? PSU? or UAM Operator?
- PSU provides its UAM operators with information about other UAM operations in Corridor and supports cooperative separation management services but does not control operation directly.
- UAM operator also supports cooperative separation management.

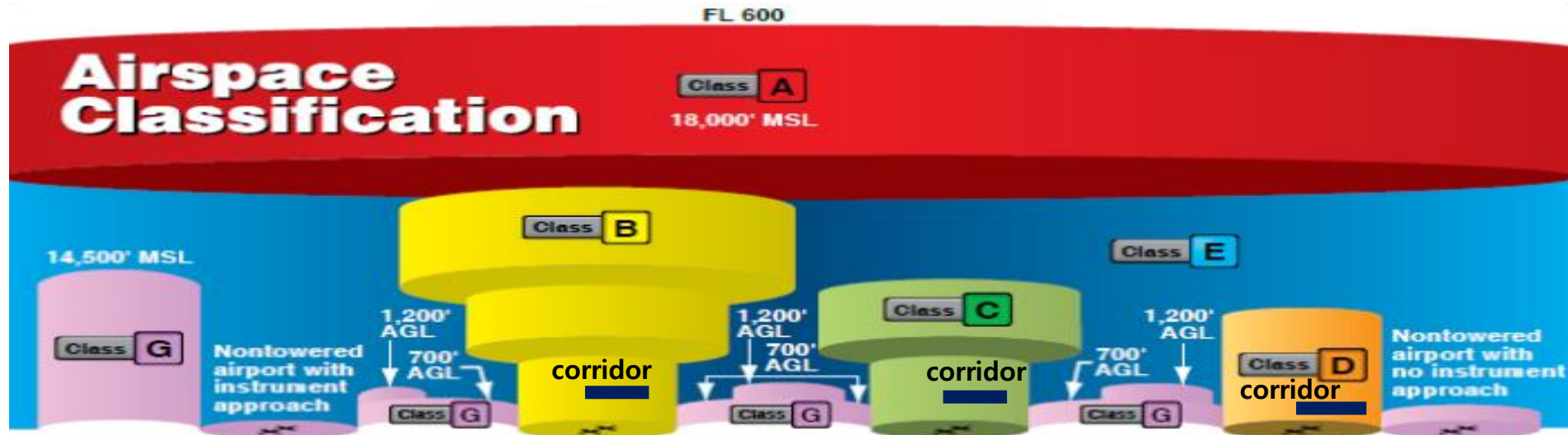
➡ Does this cooperative management can ensure the safe operation of UAM?
What is the portion of responsibility and liability for each Participant?

Legal Issues (2) – Aircraft entering corridors in Uncontrolled Airspace



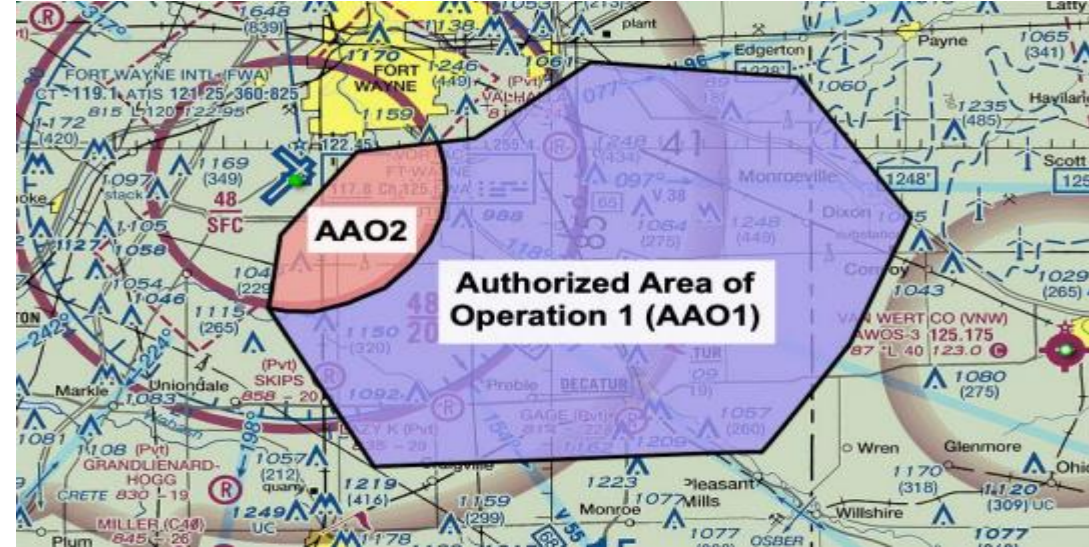
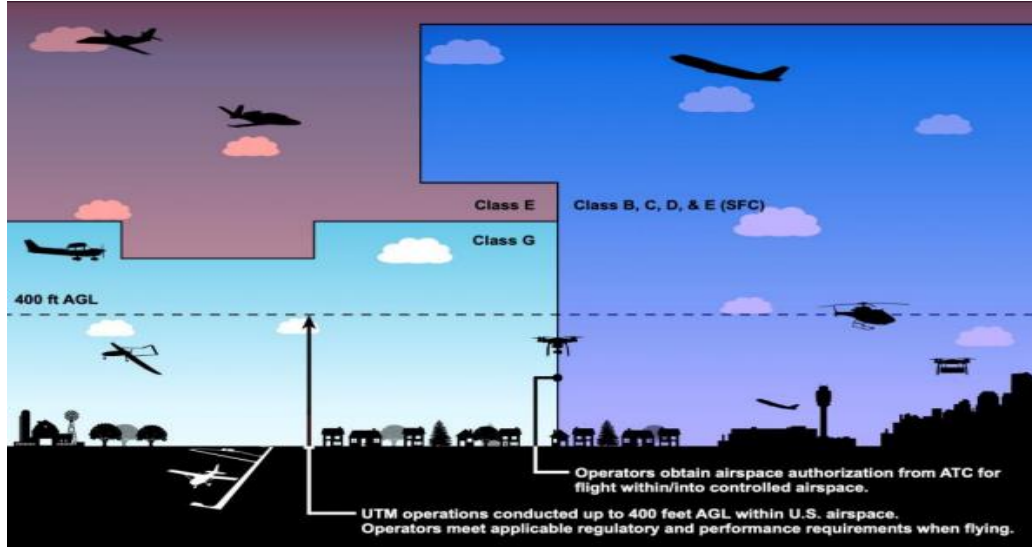
- In Controlled Airspace, ATC ensures separation of non-participating aircrafts from the cooperative operations and/or Cooperative area (UAM Corridor)
- **But, What if aircrafts pass through UAM corridors in Uncontrolled Airspace?**
- UAM PICs can be offered information from PSU about other UAM's operation based on Flight Intent, but Small Aircrafts usually do not have those equipment to exchange information
➡ Need for plans for Possible Contingencies of this case in Uncontrolled Airspace

Legal Issues (3) – UAM Operation in Controlled Airspace (Class "B", "C", "D")



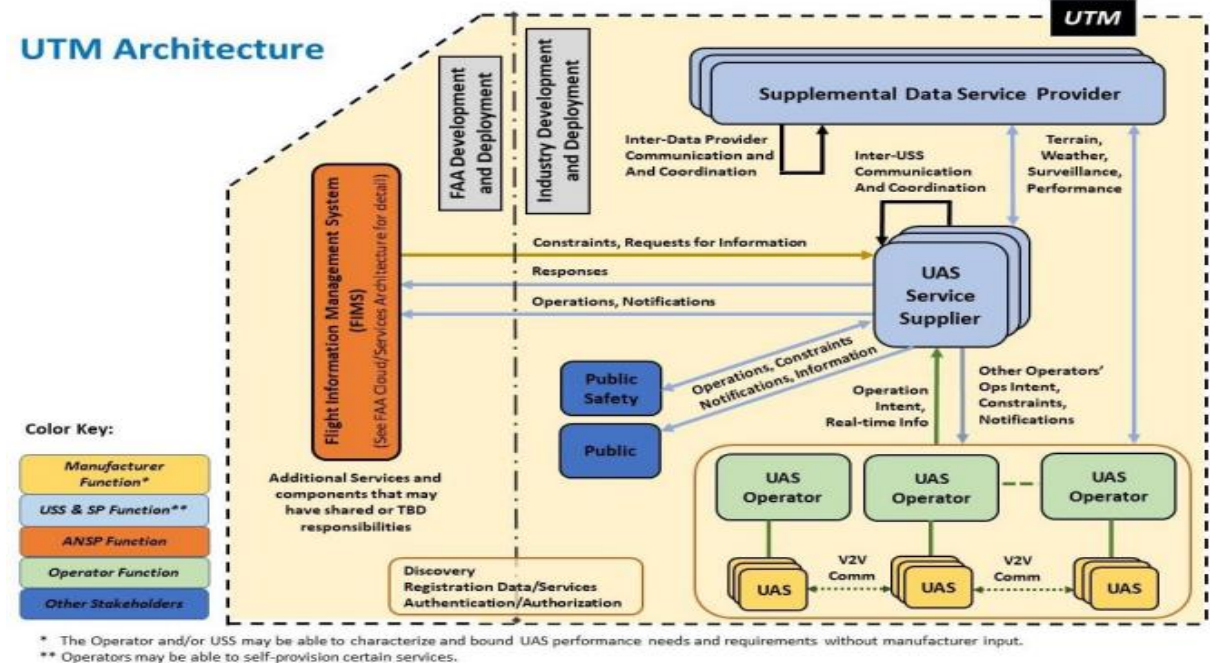
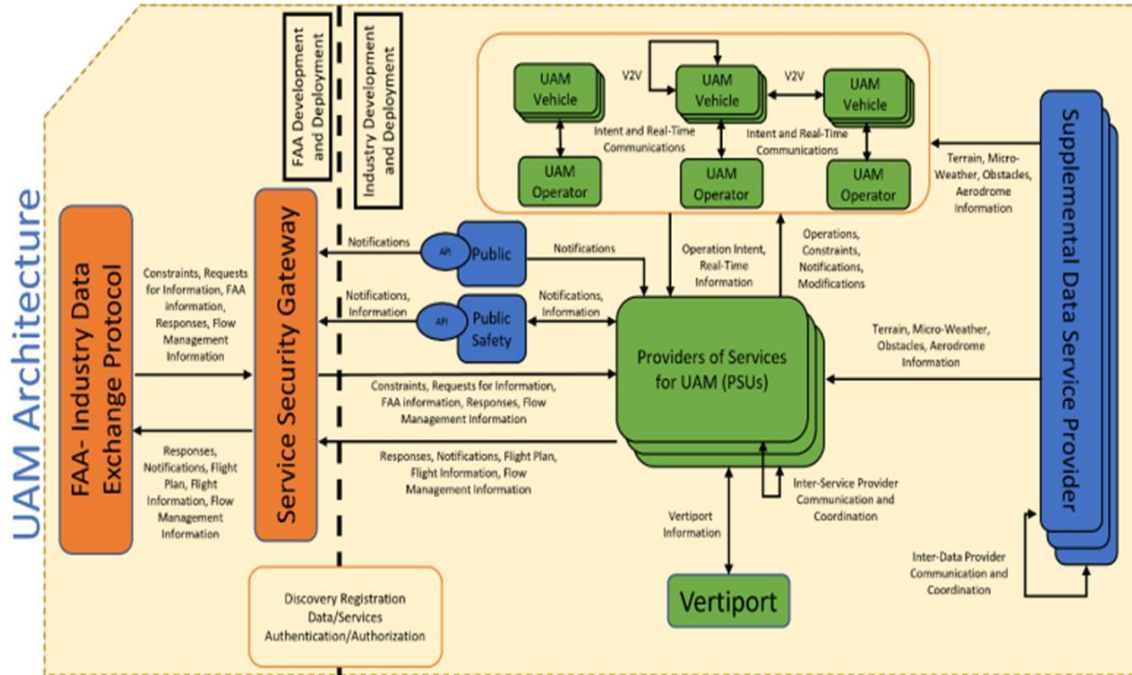
- ATC makes sure safe movement of aircraft operating within Controlled Airspace.
- On the contrary, In UAM Corridor, ATC does not directly provide air traffic service to UAM PICs.
- Therefore, ATC controls UAM operation from departure to UAM Corridor (Corridor Entry Point) and from UAM Corridor (Corridor Exit Point) to Arrival.
- However, the section controlled by ATC is relatively very short compared to the corridor, and unlike other aircrafts in Controlled Airspace, Moreover, UAM landing is managed cooperatively by the PIC, UAM Operator, PSU, and Vertiport not by ATC.
- Considering Class B is the busiest airport airspace (Class C, D is not as much busy as Class B, but busy)
➡ The section from Vertiport to Corridor (Vice Versa) should be minimalized

Legal Issues (4) – UAM vs UA (Unmanned Aircraft)



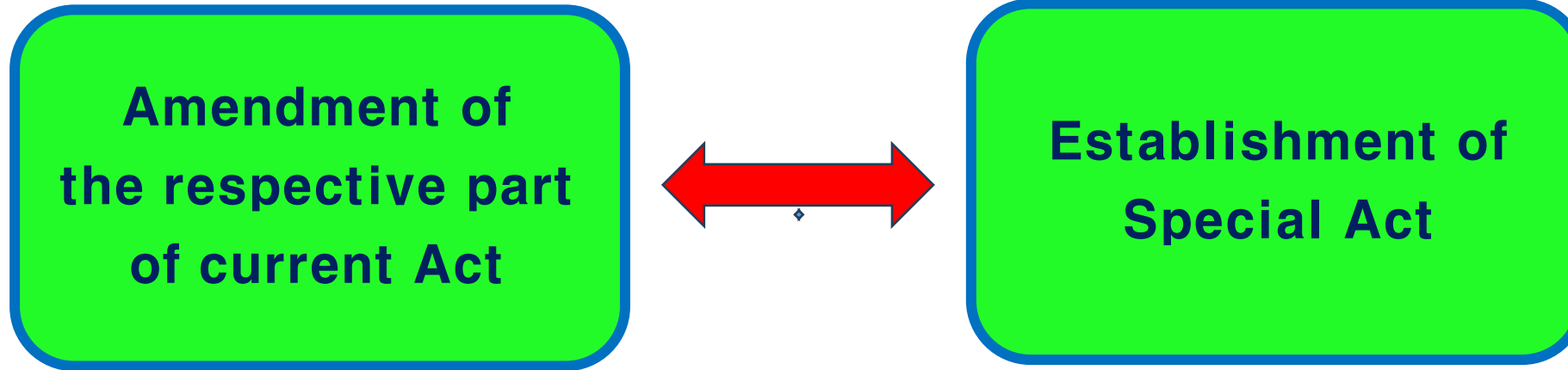
- The Airspace of UAM and UA is basically separated by altitude (1,000~2,000 ft UAM, Under 400ft UA)
- In case AAO (Authorized Area of UA Operation) is set on the airspace where UAM corridors pass and when some off-nominal situations happen to UAS (Unmanned Aircraft System), UA may enter UAM Corridor especially, in uncontrolled Airspace.
- According to UAM and UTM (UAS Traffic Management) Architecture, there are no direct ways to exchange data and information between PSU and USS (UAS Service Supplier). They can be exchanged via FAA-Industry Data Exchange Protocol or FIMS (Flight Information Management System) indirectly.
- Direct ways to change data between PSU and USS should be made (That is in Korean UAM Concept 1.0)

Legal Issues (5) – UA (Unmanned Aircraft) for UAM



- **What if UA will be used as an eVTOL of UAM? Which architecture should be applied to that?**
 - **UTM Conops 1.0 (2018) limits UA to small UAs (under 55 lbs (25 kg)), but no weight limit in UTM Conops 2.0 (2020). So, Unmanned eVOL can be subject to the Architecture of UTM Conops 2.0, but it dose not conceive transportation of persons.**
- ➡ **It will be included in the evolved UAM Conops. (Planned to be introduced in 2030 in Korea)**

Airspace Law Integration – Two Approaches to Domestic Air Law System



- The introduction of New Air Mobility usually needs some change of current regulations of domestic Air law system.
- Normally, there are two ways to accept New Air Mobility operation concept and procedures.
- One is to change some respective parts of each Air Law, the other is to enact a Special Act.
- Generally, if it is expected to change a few, it would be the former, in case of huge changes, it might be the latter, but both ways can be used complementarily.

➡ **It depends on each state's air law system and legislative policy and tradition.**

Airspace Law Integration – Korean Air Law System



Aviation
Safety Act

Aviation
Business Act

Airport
Facility Act

Aviation
Security Act

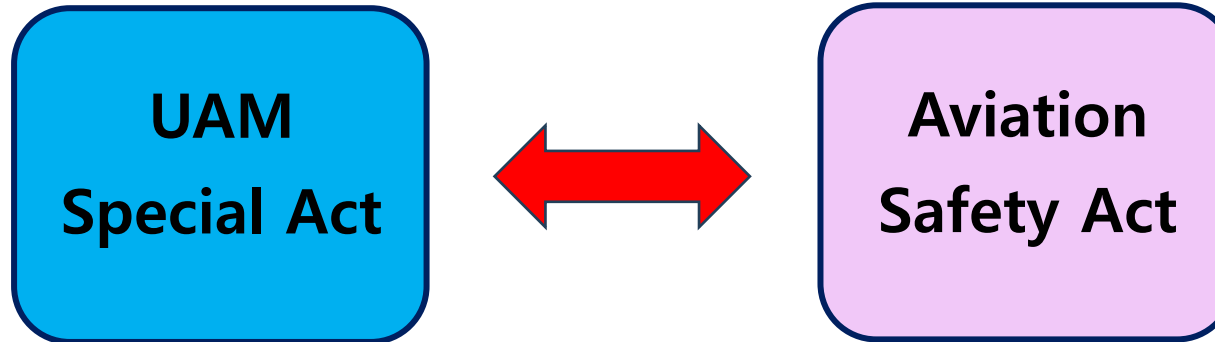


Drone
Special Act

UAM
Special Act

- Basically, Korean Air Law system consists of four main Air-related Acts.
- Those are Aviation Safety Act, Aviation Business Act, Airport Facility Act, Aviation Security Act
- Korean government selected the way of creating Special Act to accept the new air mobility.
- The official title of Drone Special Act is "Act on Promotion of Utilization of Drones and Creation of Infrastructure Therefore" and that of UAM Special Act is "Act on Promotion and Support for the Utilization of Urban Air Traffic"
- However, if both special acts do not cover the whole essential parts of their operation, the four main Acts also need to be amended on some relevant parts

Airspace Law Integration – Establishing UAM Corridor

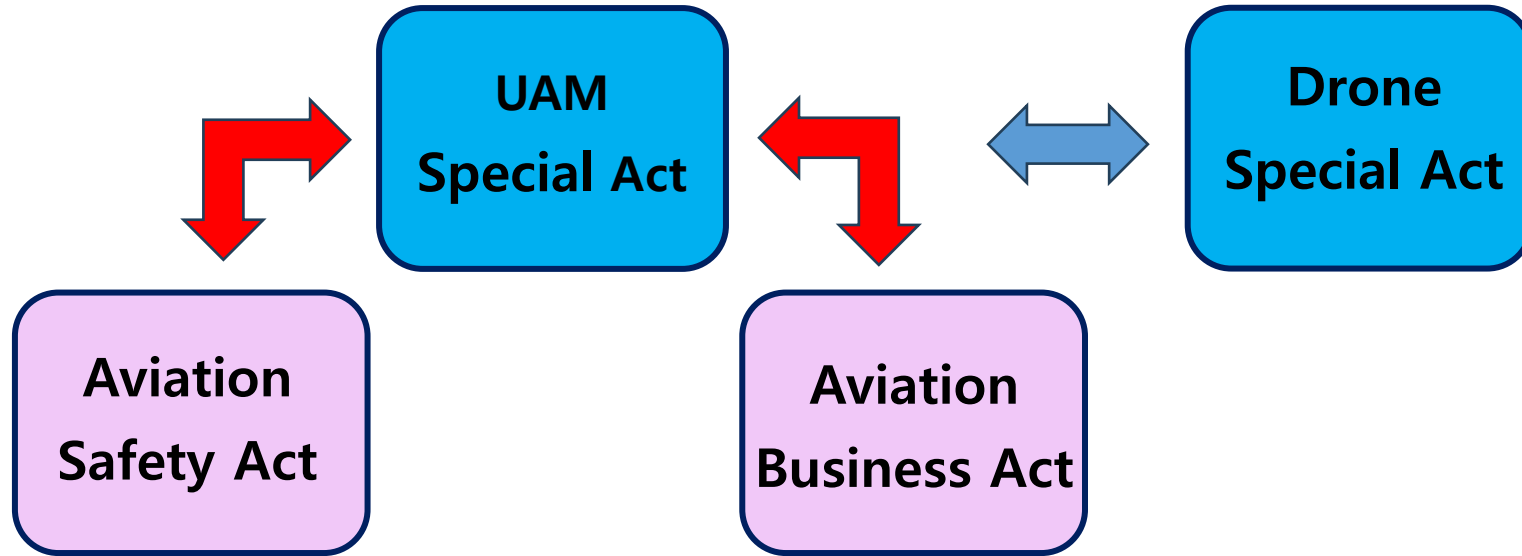


- UAM Special Act empowers The Minister of Land, Infrastructure and Transport to establish UAM Corridor on the airspace of the area appropriate for UAM operation.
- However, there are no detailed regulations on procedures of establishing UAM Corridor.
- Basically, the matters related to the establishing and managing airspace are stipulated in the Aviation Safety Act.
- It says that "The Airspace Committee shall be established under the authority of the Minister of Land, Infrastructure and Transport to deliberate on the matters necessary for the establishment and management of airspace."
- **It is important to apply and interpret the acts so that both do not conflict with each other.**

Airspace Law Integration – Classification of Airspace in Korean Air Law

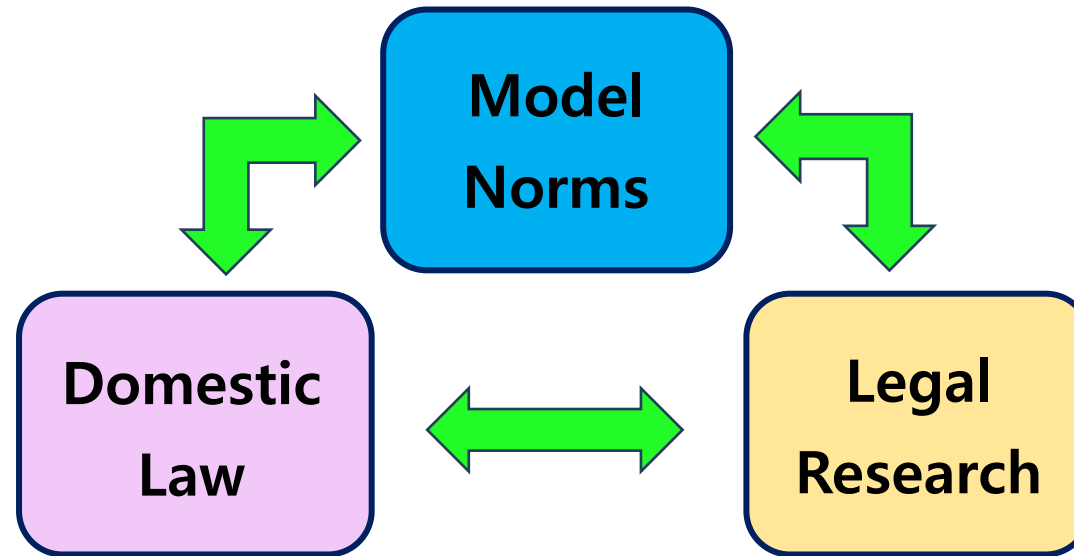
Classification		Characteristics
Controlled airspace	Control Zone	Rad. 5NM, 3,000~5,000ft
	Control Area: CTA	1,000ft ~ FL 600, 5,500ft ~ FL 600
	Aerodrome Traffic Zone	Rad. 2~3NM, 2,000~3,000ft
Uncontrolled airspace	Advisory Zone	Class "F"
	Flight Information Zone	Class "G"
Regulatory airspace	Prohibited areas	for safety and national defense reasons
	Restricted areas	Protects of aircraft from anti-aircraft fire.
	Ultralight vehicle flight Restricted Area	For flight safety of Ultralight vehicle
Warning airspace	Civil Aircraft Training Area, CATA	Need for separation of IFR aircraft
	Military Operating Area, MOA	Need for separation of IFR aircraft
	Danger Area	Risk to aircraft or ground facilities
	Alert Area	Unusual types of aviation are conducted
	Ultralight vehicle flight Areas	Ultralight vehicle aviation is conducted

Airspace Law Integration – Establishing PSU's authority and responsibility



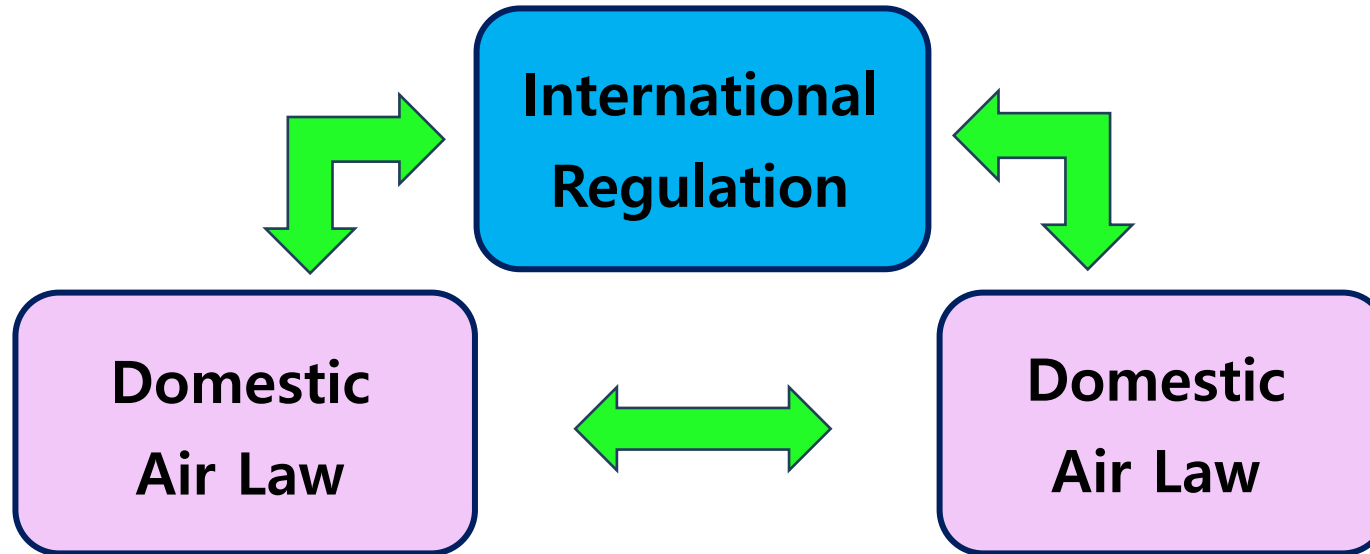
- UAM Special Act empowers The Minister of Land, Infrastructure and Transport to designate PSU.
- However, there are no detailed regulations on procedures of designating PSU.
- Basically, the matters related to the Air business are stipulated in the Aviation Business Act and Air Traffic Service is subject to Aviation Safety Act.
- **It is essential to establish the procedures on sharing information and data between ATC and PSU (if necessary, also between PSU and USS) in detail for ensuring safe operation of UAM.**

Airspace Integration – The Role of ICAO



- The Advent of New Air Mobility is essentially followed by New Norms regulating related legal issues.
- Advanced air-industry states will be leading countries in creating new procedures and rules through constant and repetitive verification.
- Those procedures and rules will be evaluated through legal Researches and those evaluation will lead to the Creation of Global model Norms such as ICAO Model regulations 101 and 102 in UAS field.
- **ICAO should create Global Model Norms to be applicable to the states introducing New Air Mobility.**

Airspace Integration – What We Should Do



- The Air and Space law is like a large organism, influencing each other, and progress promotes another progress. This is why I am convinced that the research on Korean drone laws and UAM laws will help develop other countries' legislation and ICAO's model regulation. For the development of drone and UAM laws, this process will have to continue under each state's legal regime.

Airspace Integration – What We Should Do



Thank You