AIRCRAFT TYPES

What Kinds of Aircraft Are Being Discussed?

Advanced Air Mobility (AAM) is often discussed as if it refers to a single type of aircraft or transportation system. In practice, AAM includes a wide range of aircraft concepts, operating models, and missions that may differ substantially from one another.

Some concepts build upon traditional aviation systems that already exist today. Others involve newer technologies such as electrification, automation, distributed propulsion, or unmanned operations. Different aircraft types create different operational needs, infrastructure requirements, community considerations, and regulatory pathways.

For local governments and public-sector organizations, one of the most important starting points is understanding that not all aircraft operate the same way, and not all aviation concepts require the same infrastructure or planning response.

Aircraft capabilities influence everything that follows in the aviation system. Aircraft performance, payload, range, weather capability, operating environment, and certification limitations help determine what operations are practical, what airspace may be needed, what infrastructure may be required, and how communities experience aviation activity. Understanding the aircraft is often the first step in understanding the planning, infrastructure, governance, and public-safety questions that follow.

Small Unmanned Aircraft Systems (sUAS)

Small unmanned aircraft systems, commonly referred to as drones or sUAS, are one of the most immediate ways many Utah communities may encounter AAM-related aviation activity. Unlike many passenger eVTOL concepts, small UAS are already widely used across public safety, infrastructure inspection, mapping, agriculture, utility work, and other practical applications.

Common uses include:

- public safety,
- infrastructure inspection,
- mapping,
- surveying,
- photography,
- agriculture,
- utility inspection,
- and logistics testing.

Most small unmanned aircraft systems currently operate under FAA Part 107 rules, although public agencies and commercial operators may also operate under waivers, exemptions, or other operational frameworks depending on the mission.

Small unmanned aircraft systems may operate from:

- temporary launch sites,
- vehicles,
- rooftops,
- logistics sites,
- airports,
- or other operating areas.

Many small unmanned aircraft operations require little permanent infrastructure, although larger or more advanced operations may depend on:

- charging systems,
- communications systems,
- operational control centers,
- detect-and-avoid technologies,
- and supporting data infrastructure.

Larger Unmanned Cargo Aircraft

Some unmanned aircraft concepts are substantially larger than the small drones commonly associated with consumer or photography use. For Utah, larger unmanned aircraft may become especially relevant for regional logistics, medical supply movement, industrial support, rural access, and other missions where long distances, difficult terrain, or limited surface transportation options create operational challenges.

Larger unmanned cargo aircraft may support:

- regional logistics,
- industrial cargo,
- medical supply transport,
- rural access,
- or mid-mile freight operations.

These aircraft may operate more similarly to traditional aviation systems than to small consumer drones. Depending on the aircraft and mission, they may require:

- airports,
- dedicated logistics infrastructure,
- protected operating environments,
- larger launch and recovery areas,

- or more advanced operational control systems.

Conventional Fixed-Wing Aircraft

Conventional fixed-wing aircraft already support many transportation, logistics, emergency response, agricultural, and tourism functions throughout Utah. These aircraft use traditional runways and airports and typically operate under well-established operational and infrastructure frameworks.

In many cases, future AAM concepts may evolve from or alongside existing fixed-wing aviation systems rather than replacing them entirely. Some legacy aircraft are being retro-fit with electric or hybrid propulsion systems, or autonomous tech stacks that allow them to fly without a pilot on board. Therefore, we should not ignore them in the broader AAM movement.

Fixed-wing aircraft may include:

- general aviation aircraft,
- charter aircraft,
- cargo aircraft,
- agricultural aircraft,
- business aviation,
- regional aviation,
- and future electric conventional takeoff and landing aircraft.

Electric Conventional Takeoff and Landing Aircraft (eCTOL)

Electric conventional takeoff and landing aircraft, often referred to as eCTOL aircraft, operate similarly to traditional airplanes but use electric propulsion systems instead of conventional fuel-based engines.

These aircraft still require runways and airport infrastructure, but they may introduce:

- lower operating noise,
- different maintenance requirements,
- new charging infrastructure,
- and different operational economics.

Because they continue to use traditional airport environments, eCTOL aircraft may integrate more easily into existing aviation systems than some other AAM concepts.

For Utah, eCTOL aircraft may be especially relevant to Regional Air Mobility because they build on existing airports rather than requiring entirely new vertical-lift networks. Their practicality will still depend on aircraft range, payload, charging needs, runway capability, weather conditions, and the ability of airports to support reliable operations.

Short Takeoff and Landing Aircraft (STOL and eSTOL)

Short takeoff and landing aircraft are designed to operate from shorter runway environments than many conventional aircraft. Electric short takeoff and landing aircraft, or eSTOL aircraft, apply electric or hybrid-electric propulsion concepts to these operations.

These aircraft may become especially relevant in regions with:

- limited infrastructure,
- rural access needs,
- mountainous terrain,
- regional connectivity challenges,
- or constrained operating environments.

STOL and eSTOL aircraft still require defined operating areas, approach and departure paths, emergency access, compatible surrounding land uses, and appropriate support infrastructure. Some concepts may operate from existing airports, rural aviation facilities, or specialized short-field infrastructure. The planning takeaway is that shorter runway needs may create new opportunities for regional access, but reduced runway length does not eliminate the need for careful aviation planning.

For Utah, STOL and eSTOL concepts may also be relevant to Regional Air Mobility, especially where shorter runways, rural access needs, mountainous terrain, or dispersed communities make traditional regional air service difficult.

Helicopters and Rotorcraft

Rotorcraft, or helicopters already perform many missions commonly discussed within AAM conversations today.

These missions include:

- emergency medical transport,
- public safety operations,
- utility inspection,
- tourism,
- infrastructure inspection,
- aerial firefighting,
- cargo movement,
- and charter transportation.

Rotorcraft are certificated under separate FAA frameworks than most fixed-wing aircraft and often operate from:

- heliports,
- hospital landing facilities,

- rooftop pads,
- temporary operating areas,
- and airports.

Rotorcraft infrastructure and operational environments are often less standardized than traditional airline airport environments. This becomes important when discussing future vertical-lift AAM concepts because many eVTOL aircraft are expected to inherit portions of the existing rotorcraft operating environment. Some legacy helicopter OEMs are exploring electric or hybrid propulsion systems, as well as autonomous capabilities for a variety of purposes.

Electric Vertical Takeoff and Landing Aircraft (eVTOL) and Powered-Lift

Electric vertical takeoff and landing aircraft, commonly referred to as eVTOL aircraft, are among the most visible AAM concepts currently receiving public attention and private investment.

These aircraft are designed to:

- take off vertically,
- land vertically,
- and transition into forward flight.

Many eVTOL concepts rely on distributed electric propulsion systems involving multiple motors or propellers. Some are designed primarily for passenger transportation, while others focus on cargo or logistics missions.

The FAA often refers to many of these concepts as powered-lift aircraft because they combine characteristics of both airplanes and rotorcraft.

Unlike conventional aircraft categories, many powered-lift concepts do not fit neatly within existing certification frameworks. As a result, manufacturers may work with the FAA under customized certification pathways that combine elements from multiple certification standards.

Powered-lift and eVTOL aircraft are often associated with vertiports, rooftop operations, urban mobility concepts, cargo missions, medical transport concepts, and distributed aviation networks.

However, different eVTOL concepts may require very different operating environments depending on:

- aircraft size,
- payload,
- battery performance,
- operating range,
- noise profile,
- and operational mission.

Utah's operating environment may also influence which powered-lift and eVTOL concepts become practical, especially in northern Utah. Density altitude during hot summer conditions, mountainous terrain, winter weather, wildfire smoke, range limitations, payload limitations, and IFR/VFR operating capability may all affect performance, reliability, and asset utilization. This does not make powered-lift or eVTOL aircraft unsuitable for Utah, but it does mean communities should evaluate proposed operations against realistic aircraft capabilities, site conditions, infrastructure readiness, and operating requirements.

Aircraft Types Influence Everything That Follows

Different aircraft types create different:

- operational rules,
- infrastructure requirements,
- airspace needs,
- emergency response considerations,
- and community impacts.

This is one reason AAM should not be treated as a single technology category.

For example, a public safety drone operation, a larger cargo UAS, a medical helicopter, an electric regional aircraft, a STOL aircraft, and a future passenger powered-lift aircraft may all involve:

- different aircraft,
- different operational frameworks,
- different infrastructure,
- and different planning considerations.

Understanding the aircraft is often the first step in understanding the operational, infrastructure, and governance questions that follow.

Key References

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