CONTRIBUTING STAKEHOLDERS

UAV National Industry Team

By Carl Mikeman, Vice President and Rose Karolenko

UNITE was formed in 2002 to collect and represent the common airspace access interests of the unmanned aircraft industry in the US. The UNITE approach is to pursue every avenue toward that purpose, to represent those interests to the FAA, RTCA, DoD, and the Congress of the United States. This representation takes the form of direct contacts, work through other aviation industry groups, and individual company efforts.

UNITE members include Northrop Grumman, Boeing, General Atomics, AAI, AeroVironment, Rockwell Collins and DRA, who represent the majority of deployed unmanned aircraft in the US: Global Hawk, Fire Scout, X47-B unmanned fighter, Predator, Predator B, Sky Warrior, Hummingbird, Shadow, Aerosonde, Raven, Scan Eagle, Global Observer, Hunter and others as well as many more in development.

While some industry groups have been helpful in supporting UAS, it appears that the UNITE dedicated voice for unmanned aircraft, working directly is not only still needed, but essential. To be most effective, this dedicated voice may benefit from being international. UNITE encourages international cooperation in some form, such as associate manufacturer members or associate UAS organizations, to exchange important information.

Although significant progress has been made there is still much to accomplish. When UNITE began, COAs for unmanned aircraft were much harder to get and took longer, and experimental certifications were unheard of. One of the consequences of the NASA-sponsored, industry-performed, Access 5 effort was the education of both the broader aviation industry and members of the FAA regarding UAS design, capabilities, and limitations. Since then we have seen the establishment of the FAA Unmanned Aircraft Program Office, RTCA SC203, on-line COA application, ASTM F38, several experimental certifications, and generally much greater UAS awareness.

Concerning the "remaining to be done" items, a recent independent study by Dr. R. John Hansman, Ph. D and Chair of the Research, Engineering and Development Advisory Committee (REDAC) at MIT, established by the FAA, arrives at a couple of findings that also reflect some of the UAS industry's needs.

"…While encouraged that the FAA is beginning to address UAS integration in the NAS, the subcommittee considers the current approach inadequate to meet the outcomes needed and timing requirements of both government and industry".

We would agree. When a given approach is pursued for a period of time and doesn't seem to be working, it suggests that this approach needs to be changed. We must ask why the ongoing deliberations are not making more progress. The reasons are many, but one thing stands out: if the right questions are not identified and addressed, the correct answers will never be arrived at.

In order to make progress on meaningful regulations and standards, rather than treating all UAS the same in a "one size of regulation fits all" manner, it is necessary to break the questions down into solvable pieces or steps. We suggest:

1. Develop meaningful classifications. Separating Small UAS (sUAS) (MTOW < 55 lbs., as per FAA nomenclature) is a start, but other operational, situational, or intended use distinctions need to be made in order to move ahead.
   - Operational factor: the operational differences between aircraft that rely on communications links for flight commands and those that can take off, fly a planned route and land without real-time communications are significant enough to need different standards. This is the Pilot in the loop (PIL) - Pilot on the loop (POL) difference.
   - Occupancy factor: In addition to, and separate from where the pilot is flying the aircraft from, is the difference in treatment whether a human is on board or not. In this case, it is not important whether it is a pilot, an emergency patient, or a technician. Many of the regulations on aircraft have to do with occupant protection, which are not needed when no one is on board.
   - Usage factor: The cross-country freight-carrying application has different requirements (with respect to certification) than local crop spraying. Airspace of operation as a category element would reflect this, and it already has equipage and pilotage requirements built in.
2. Create a set of standards for each classification. They should be related to the UAS-unique areas:
   1. Sense and avoid;
   2. Communications;
   3. Control station; and
   4. On board "flight computer suite".

   The control station and flight computer represent a system of related off board and on board components that might be combined for purposes of standards. With few exceptions, all else is the same as manned and should not need new standards.
3. At the same time, provide a means, such as a form of ODA designation for UAS, by which manufacturers can authorize flight from their own airports in their own FAA approved and monitored test areas without a military sponsor.

"It was reported that the target level of safety has been increased to 10-9. This level does not appear to be statistically achievable to the NAS Operations Subcommittee. The target level of safety needs to be reassessed for its reasonableness and applicability. Safety levels of new systems should be compared against a baseline which is defensible based on current operations and statistical analyses."

This assessment would appear to be correct, and an important point needs to be made regarding equivalent safety. It is one example of the difficulty of an industry with a long history of regulation actually looking at a new technology with an open mind.

As Dr. Hansman points out, 10-9 may be impossible to meet, for manned aircraft as well as unmanned. Even if these numbers were justifiable when there is at least one, and possibly hundreds of people on board, it is not realistic to automatically, without examination of the differences, apply this value to

aircraft with no one on board.

Another point - in the case of the crash of a manned aircraft, the probability of death is very high, about 25%, or about 500 per year in production GA in the US. For UAS, the numbers of injuries and fatalities on board are both reduced to zero. While this seems trivially obvious, it is approximately a 3 order safety advantage that does not get reflected in the target safety considerations.

At this point the likelihood of fatalities on the ground always comes up. In fact, it is as the AOPA's annual Joseph T. Nall report has pointed out consistently over the years: "The thought of airplanes falling out of the sky, causing death or injury on the ground, is a common worry for non-pilots. This concern is often cited as a reason to restrict or close GA airports, even though statistics show it is far more fiction than fact." The probability is in fact approximately 4.3-8 per flight hour, or one chance in 23,255,813. You are 21,000 times more likely to die in an automobile crash on your way to work than to get killed by a falling airplane.

Therefore, to compare apples to apples, it is the rate of injury and fatality that must be calculated for meaningful comparison of safety between manned and unmanned aircraft, rather than the number of crashes themselves. We can debate UAS safety analyses, fault trees, and risk analyses forever but this inherently safe, empirical bottom line should be recognized in the development of standards and regulations.

To summarize from the manufacturer's perspective: for progress toward full UAS airspace integration the community needs the same development and certification mechanisms granted to the manned aircraft community:

1) Convenient and cost effective means of access to the airspace for testing, development, and airworthiness demonstration.
2) Defensible and applicable safety probability measures that can realistically be met and will maintain the bottom line safety of the world's airspaces
3) Applicable and timely standards for certification.

More information about UNITE, its member companies and their products, is available at: http://www.uniteaero.com/

Carl Mikeman
Vice President
UAV National Industry Team