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Safety Assessment for UAS: A Process Still Under Discussion

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IYK 46 - Nov 09, 2013

Let's discuss here the Safety Assessment activity to Unmanned Aerial Vehicles – UAV or as later was called: Unmanned Aircraft Systems – UAS.

In reality, we will have here just a chat about the Safety Assessment for UAS, that is, a few thoughts fruits of our research and discussions on the subject.

Talking to professionals around the world, in forums dedicated to Safety, in order to observe the State of the art in this field, we have seen that Safety Assessment is a topic that has evolved little or almost nothing, in the area of UAS. There is so far no standard like the FAR XX-1309 treating of the matter, as those existing to manned aircraft in civil aviation.

In reality, UAS is nothing new, since they exist over 60 years in the American Armed Forces, being first used in reconnaissance missions and, more recently, as deadly and accurate weapon of war, as happens in Afghanistan and other countries.

As it turns out, there is already a reasonable maturity in this field design technique, but with a strong evolution in military area. Of course, the civil area is already assimilating this technology, but by a series of restrictions, there are no standards for this type of aircraft for operation in free space along with manned aircraft. Today, the UAS fly in restricted spaces.

We must bear in mind that the UAS comprises the aircraft and the Ground Station, the "pilot" controlling the aircraft on the ground. Thus, the airworthiness authority should worry about the complete system, when issuing its standards.

Unlike the transport planes, which have a single flight configuration, the UAS can perform many missions with different configurations. In this respect, resembles the military planes with their multiple missions. When we discuss about Safety in manned aircraft civil aviation, we're talking mainly about safety of occupants of the aircraft (crew and passengers). However, when we talk about UAS, obviously the concept changes. **The concern is** with the people on the ground, the properties, the fauna and the flora. Thus, the environment is an important goal of safety in UAS.

In reality, it is necessary to avoid two things: collisions in flight and uncontrolled impact with the ground. The concept of severity of failure conditions is quite different from that used with manned aircraft. For example, the condition of catastrophic failure in manned aircraft would be one that avoided the flight continued and safe landing. For UAS, this is not entirely a catastrophic situation. If the UAS has system FTS (Flight Termination System) able to take the aircraft to the ground so as not to produce violent impacts that could cause deaths and devastation, such failure condition would not be considered catastrophic. A parachute, for example, could solve this problem, as already occurs with small UAS.

In our opinion, it would not make sense to use other kinds of severities such as conceptualized today: Major Severe (or Hazardous), Major and Minor, once these severities relate mainly to the workload of the crew and occupant discomfort, severe injury or even death of occupants.

The question of the collision will certainly lead to the requirement to install anti-collision systems on these aircraft. Unfortunately, this problem is currently still to be resolved, and may be the main problem to solve.

Before closing, we would like to mention one point we have always defended, when we talk about safety, in general. We always emphasize that the certification is concerned with the environment too, precisely because of the catastrophic failures that lead manned aircraft to precipitate in the soil, promoting deaths and / or devastation to the environment. However, whenever we hear of some that this is not the ultimate goal, but yes the safety of the occupants of the aircraft.

Well, with the advent of UAS, the environment has become a factor to be preserved even, since we have no occupants, and that, yes, is the ultimate goal. Therefore, the DCA-BR is indeed very concerned about the development of standardization by the authorities. It is no wonder we held meetings on UAS, as it promoted recently the International Conference on UAS in Brazil (São José dos Campos – SP) together with the UVS International.

The environment is a concern to the DCA-BR, and this concern is clearly stated in its Statutes.

We will continue monitoring the state of the art of this matter. Any news that emerges will be disclosed.

Thank you very much