DANGEROUS GOODS PANEL (DGP)

TWENTY-SEVENTH MEETING

Montréal, 16 to 20 September 2019

Agenda Item 10: Other business

UNMANNED AIRCRAFT SYSTEMS (UAS) FOR HUMANITARIAN AID

(Presented by the Rapporteur of Ad Hoc Working Group on Carriage of Dangerous Good for Humanitarian Aid Operations on Unmanned Aircraft (UA))

SUMMARY

A DGP ad hoc working group was established to review draft guidance on the carriage of dangerous good for humanitarian aid operations on unmanned aircraft (UA). The material would be included as part of a toolkit to aid governments and international aid agencies in planning and conducting humanitarian aid operations using UA. The toolkit was being developed by an ICAO task force. This information paper contains the output of the DGP ad hoc group's work.

Page 3: Dangerous Goods, Understanding the Risk and Responsibilities

General considerations when transporting dangerous goods

Unmanned aircraft (UA) are being used to transport goods for humanitarian aid and emergency response. Some of the goods required to be transported may be classified as dangerous goods.

Due to the differences in the type of operations carried out by UA compared with manned aircraft, there may be circumstances when the full provisions of the Technical Instructions are not appropriate or necessary, due to the operations involving unmanned sites, remote locations, mountainous areas or construction sites, etc. In such circumstances and when appropriate, the State of the Operator may grant an approval in order to permit the carriage of dangerous goods without all of the normal requirements of the Technical Instructions being fulfilled.

This guidance applies only to where a State has determined that the use of the UA is appropriate. Where the dangerous goods are to be carried outside of the UA all appropriate provisions of the national or international modal regulations apply.

Dangerous goods are articles or substances that are capable of posing a hazard to health, safety, property or the environment and which are shown in the list of dangerous goods in the ICAO Technical Instructions or which are classified according to the Technical Instructions.

Dangerous goods are classified according to nine classes based on the hazard. Some hazard classes are further divided into divisions. The nine classes are:

- Class 1: Explosives
- Class 2: Gases
- Class 3: Flammable liquids
- Class 4: Flammable solids; substances liable to spontaneous combustion; substances which, on contact with water, emit flammable gases
- Class 5: Oxidizing substances and organic peroxides
- Class 6: Toxic and infectious substances
- Class 7: Radioactive material
- Class 8: Corrosive substances
- Class 9: Miscellaneous dangerous substances and articles, including environmentally hazardous substances

Examples of the kinds of dangerous goods transported by UA:

- Compressed gases such as aerosols and gas cartridges;
- Flammable liquids, such as ethanol, ether;
- Sterilization materials such as ethylene oxide;
- Infectious substances such as sample for analysis;
- Toxic substances such as medicines;
- Miscellaneous dangerous goods such as lithium batteries and first aid kits.

Packing of dangerous goods should be performed by persons with training to handle and package dangerous goods. If the cargo contains infectious material, additional biosafety training is required.

A safety risk assessment should be performed by the operator taking into account the types and quantities of dangerous goods that are planned to be carried. The safety risk assessment should consider the likelihood that the operation will result in the dangerous goods being released from the packaging and the consequence should a release occur (see *Annex 19 – Safety Management* and its supporting *Safety Management Manual (SMM)* (Doc 9859)).

ICAO Technical Instructions strive to mitigate the risks of transporting dangerous goods at the package level. Due to the risks associated with transporting dangerous goods, adequate training is required. It is important that personnel are trained so that they are able to properly pack, mark, label, load/unload and secure the dangerous goods safely. This can only occur if all relevant personnel are trained (see Part 1, Chapter 4 of the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284))

In considering the packing and packaging requirements for dangerous goods, the provisions of the Technical Instructions should be followed to the extent possible. In the absence of packaging that meet the requirements of the Technical Instructions, the packaging should comprise the receptacle(s) that contains the dangerous goods surrounded by absorbent material placed into a bag packed into a rigid outer packaging.

If the package is not contained within the UA but rather suspended, consideration should also be given to the type of packaging used and to the protection of those packagings, where necessary, from the effects of airflow and weather (e.g. by damage from rain or snow).

Provisions for an emergency response plan addressing the carriage of the dangerous goods must be included in the applicant's submission as well as dangerous goods accident and dangerous goods incident reporting procedures.

Suggest that this material should be in a separate annex of considerations for the senders of dangerous goods:

<u>General considerations for the entity shipping the dangerous goods:</u>

- Pack in the lowest volume container necessary for intended purpose. Liquids should be packed so that there is sufficient space to allow for expansion
- Detail contents of packages by including description, container type, volume and number of items. Each item should have a unique identifier

Biological:

- If possible, neutralize or inactivate infectious substances e.g. dried blood spots
- Provide pathogen data sheets or provide information about hazards related to infectious substances, including deactivation and waste disposal

Chemical:

- Choose the least reactive chemical for the purpose
- Choose the least reactive (or diluted) state of that chemical

Held for possible use in an annex.

1) Use volume of dangerous goods to be carried and packaging technique information that was provided by the sender **to determine the likelihood** of leakages, spills, or unintentional release
    a. Large volume liquids (and gases) will have the highest likelihood
    b. Micro volume solids will have a low likelihood
    c. Minimal packaging will have the highest likelihood
    d. Triple packaging will have a low likelihood

2) Determine the **severity of consequences** of leakages, spills, or unintentional release
    a. Category A infectious pathogens are considered high consequence, in that they are spread by aerosolization, with no vaccine or cure, and will therefore have the highest consequences, potentially affecting multiple persons or animals
    b. Infectious pathogens that are spread by ingestion, for which prophylactic treatment or a cure is available will have moderate consequences
    c. Non-communicable pathogens for which prophylactic treatment or a cure is available will have a low consequence
    d. Chemicals with high toxicity to human, animal and aquatic life will have the highest consequences, and may affect multiple persons or animals
    e. Chemicals that are highly corrosive will have a high consequence to package handlers, receivers

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