

INTERNATIONAL AIRBORNE GEOPHYSICS SAFETY ASSOCIATION

# Recommendation to Include Specific Safety Requirements in Geophysical Survey Contracts & Proposed Survey Contract Annex

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The Safety Policy Manual referred to in this document is available to members on the IAGSA web site. Non-members may obtain a copy upon request to:

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### 1.1 Introduction

IAGSA representatives from survey, aviation and exploration companies are working together to enhance safety in airborne geophysics. Geophysical survey accident statistics show that a new accident will most likely bear close resemblance to a previous one. This illustrates where IAGSA must concentrate its efforts. Considerable effort has gone into developing recommended practices that address some of the recognised problem areas. The practices that have been developed can help prevent accidents. For this initiative to achieve its potential, these recommended practices must be broadly implemented and consistently applied.

Everyone involved in a survey wants to conduct a safe operation, but all too often an accident investigation reveals that a small step taken by one or more of those involved during the process could have prevented the accident. IAGSA members believe that each survey proposal should be subjected to a thorough risk assessment. Such a risk assessment involves the identification of potential hazards for the specific project, their likelihood and recognition of the possible severity of any accident which could result from those hazards. Risk mitigation requires a suitable management strategy and provisions. The "IAGSA Survey Contract Annex" provides a tool for the development of a risk management strategy for airborne surveys.

Suppliers of airborne survey services and companies using those services share a duty of care. The level of involvement in aviation safety by exploration companies varies across a broad spectrum. Companies with aviation experts within their staff usually conduct safety audits on their suppliers to establish that the performance of a proposed aircraft and safety management system is adequate for a given project. They then include specific safety requirements in their contracts. Others, with no in-house aviation expertise may go to outside consultants for similar advice or rely entirely on the supplier to conduct a safe survey.

IAGSA would like to see all exploration companies assume an active role in advancing safety and in helping to remove some of the existing disincentives to safety. This is a challenge for those in the industry because some of IAGSA's recommended practices come with a short term price tag. This may mean that a supplier that would like to follow IAGSA recommended practices will find his or her company competing against others that do not make the necessary investment and commitment to high safety standards. Nevertheless, companies that do not invest in safety initiatives, such as those recommended by IAGSA lack rigour in their approach to risk management, and while their proposal may produce some technical or financial benefits for the client of a particular survey it will inevitably lead to more accidents and higher costs for the industry as a whole; a scenario that benefits no party.

Using an appropriate risk assessment model for each project, contractors are able to identify and implement applicable recommended practices from the "IAGSA Safety Manual and the IAGSA Survey Contract Annex". Exploration companies can assist with this process through contractual requirements.

### 1.2 Recommendation

IAGSA recommends that:

Any party contracting the services of an airborne geophysical survey company incorporate in those contracts, at the tender stage, the "IAGSA Survey Contract Annex" or a similar document that contains, as a minimum, the items in the IAGSA Annex

With this procedure in place all potential suppliers will be fully aware of the safety provisions during the bidding process making safety an integral part of the survey planning and final contract.

**2.1 Introduction**

The party contracting the airborne geophysical survey (Company) and the party supplying the services (Contractor) each has a Duty of Care to ensure that the survey is carried out safely. The Contractor shall have a Safety Management System and ensure that flight operations meet or exceed regulatory and Company safety requirements.

The provisions contained herein have been prepared by the International Airborne Geophysics Safety Association (IAGSA) and have been drawn from IAGSA's Safety Policy Manual. They represent those provisions normally appropriate to airborne surveys. Additional background and implementation details may be found in the Safety Policy Manual and the Contractor should reference the manual as necessary.

The provisions in this Annex are not exhaustive and may be amended or extended as necessary in accordance with the survey specific risk assessment.

**2.2 Job Safety Analysis**

The contractor and where applicable the aircraft operator will complete a Job Safety Analysis (JSA) for review and acceptance by the Company before awarding a contract. The JSA should include, but not be limited to, the provisions described in this Annex and IAGSA's Guide to Risk Analysis. (Safety Manual Appendix V) Provisions and practices shall be developed and documented to mitigate the effect of identified hazards.

**2.3 Survey Height**

Based on pilot reaction times and other factors, it is generally acknowledged that the lower the survey is flown, the higher the risk associated with the operation. Current industry practice often dictates low clearance heights. To achieve a safe survey height; the Company will specify the maximum clearance height possible, consistent with the objectives of the survey to be flown; and the Contractor will conduct a risk analysis that emphasises the risk factors which pertain to survey height. These factors shall, as a minimum, include the following:

- terrain relief and elevation above the trees or the tree canopy
- aircraft performance
- aircrew flight and duty times
- prevailing weather conditions
- anticipated density altitude
- pilot experience and recency
- planned flight speed

**2.4 Turning Procedures**

All turns at low-level should be limited to a maximum angle of bank of 30 degrees and be done at a constant altitude. No climbs or descents should be carried out during the turn. If the terrain or survey height dictates that a climb is necessary the aircraft should be climbed to the required height prior to commencing the turn and any descent back to survey height should be done after established in a wings level attitude.

**2.5 Minimum Safe Survey Speed**

The minimum safe survey speed is to be the greater of: 130% of clean stall speed( $V_s$ ); 110% of best single engine rate of climb speed ( $V_{y_{se}}$ , if applicable), or minimum safe single engine speed ( $V_{sse}$ , if published). This minimum speed shall be observed even when exchanging airspeed for altitude during a climb and should be raised as necessary to account for local conditions such as turbulence and gusty winds.

**2.6 Performance Monitoring**

Performance parameters, including aircraft speed, height above terrain and drupe, will be periodically reviewed using data collected during the survey. Deviations below minimum survey speeds and minimum height will be investigated and corrective action taken to ensure that safety margins are not compromised. The frequency of review should be such as to identify any discrepancies as early as possible. (IAGSA's Technical Committee is working on a protocol that will provide practical guidance for; identifying the kinds of data that should be available; how often it should be sought; and what to do when hazardous flying is detected or suspected)

### 2.7 Flight Following

The operator will have in place for all survey flights a flight following system that includes scheduled position reports, position logs maintained on the ground, operational flight plans and overdue/emergency response procedures. If the survey is being conducted in an area where it would be difficult to find a downed aircraft or ground based communication facilities are severely limited the parties should consider using a satellite based tracking system in conjunction with position reports.

### 2.8 Survival

In the event that the aircraft's survival kit is destroyed in a crash, each crew member carry on his/her person essential survival items that include a personal locator beacon, means to start a fire, a small knife and a signal mirror.

### 2.9 Underwater Escape Training

If the survey is over water, all crew members shall have undergone underwater escape training at an acceptable training facility during the past three years. This training should have also cover sea survival and use of emergency equipment.

### 2.10 Fire Extinguisher Training

All crew members, including equipment operators, shall receive annual training in the use of fire extinguishers in fighting in flight fires.

In order to quickly extinguish any fire in the survey equipment, an appropriate fire extinguisher shall be readily available to the equipment operator.

### 2.11 Monitoring of Radios

During survey flights radios are to be turned on and selected to the appropriate ATC or enroute frequencies. Additionally, equipment permitting, common air to air and emergency (121.5 MHz) frequencies should also be monitored.

### 2.12 Maximum Flight Duration

The maximum flight duration for a single flight shall be five hours (excluding transit time) for a one pilot crew and eight hours (excluding transit time) for a two pilot crew.

### 2.13 Flight and Duty Times

The maximum number of flight hours shall be as follows:

- 40 hours in any 7 consecutive day period;
- 70 hours in any 14 consecutive day period;
- 120 hours in any 30 consecutive day period;
- 1200 hours in any calendar year.

The maximum duty time in any one day shall not exceed 14 hours.

The maximum duty time shall not exceed 60 hours in any 7 consecutive day period.

The pilot shall have a minimum of 2 days rest within a 14 day period. These may be taken separately or

together. If taken separately, one day of rest shall be defined as 30 consecutive hours free of duty.

### **2.14 Fuel**

The pilot shall take all necessary measures to ensure that any fuel loaded onto the aircraft is not contaminated. (Detailed procedures are outlined in IAGSA's Safety Policy Manual).

### **2.15 Use of Helmets**

Use of helmets is to be considered on a case by case basis and where they are judged to enhance pilot safety, helmets shall be worn.

### **2.16 Night Surveys**

To conduct a night survey the aircraft must be IFR certified and equipped with at least two independent and dissimilar IFR certified navigation systems that can be used in the survey area.

The survey shall be flown at least 1000 feet above all obstacles within the operational area and a 10 nautical mile buffer around the operational area. The operational area shall include the manoeuvring area for line turns and lead ins.

### **2.17 Pilot Only Operations**

For single pilot operations without an equipment operator, the pilot's duties shall be those normally associated with flying the aircraft and those duties shall not be increased because of the absence of an operator.

### **2.18 Training Syllabus**

The aircraft operator engaged in geophysical survey flying will have in place and utilise an appropriate training syllabus for low level survey flying. Chapter 3 of the IAGSA Safety Policy Manual provides a guide to the contents of a training syllabus.

### **2.19 Minimum Temperature Limit**

The minimum temperature limit for operations shall be -35 Degrees Celsius.

### **2.20 Use of Aircraft Heater**

The use of aircraft heaters shall not be limited in the interest of "clean" data.

### **2.21 Tour of Duty**

Due consideration shall be given to crew rotation that takes into account factors such as remoteness of the field site, severity of climate, quality of accommodation and food, etc.

### **2.22 Incentive Pay**

Flight crews shall not be paid on the basis of hours or kilometres flown.

### **2.23 Use of Oxygen**

Any time a survey flight, or portion thereof, is conducted above 10,000 feet ASL, in an unpressurized aircraft, all crew members shall continuously wear an oxygen mask supplying oxygen.

### **2.24 Pilot in Command**

Notwithstanding the above, it is recognised that the pilot in command will always have the final word in relation to the safe operation of the aircraft.