



## Statement of Work

### Development of Plug-in for software TseTse v3.1.0

#### 1. Background

This Statement of Work describes the requirements for the development of a plug-in for an existing software named TseTse version 3.1.0. This software is used to analyse the images of a trap for tsetse flies. These images are taken automatically by a camera at preconfigured time intervals. The trap, named geo-referenced fly-round, consists of a blue sticky target mounted on the back of a 4WD vehicle. The tsetse flies are attracted to the sticky target by the colour, odour and movement of the vehicle. The camera is facing the blue sticky target and is configured to take geo-tagged images framing the target at predefined time intervals (e.g. every 20 seconds). As the vehicle moves along entomological surveillance transects, the flies captured in the sticky target appear in the collection of geo-tagged images. The current version of the software assists the user to count and geo-reference the catches of tsetse flies that can be seen in the collection of images.

The functionalities of the current version of the software are described in the Users' Manual that is annexed to this document. Basically, after loading a collection of images corresponding to one entomological transect, the user will identify the flies and mark them in the last image. After performing an homography of all the images in the collection, the software will transform the marks in the last image to adjust their positions in the previous images.

In recent years, this system has been successfully used to map at the national scale the distribution of the tsetse species *Glossina swynnertoni* in Tanzania. It has also been used to conduct entomological surveillance of *Glossina morsitans submorsitans* in Zambia and *Glossina morsitans morsitans* in Zimbabwe.



Nevertheless, it has been noted during the field work that the analysis of the pictures becomes time consuming when the number of catches is very high, since some tsetse flies that are stuck in trap manage to crawl through the glue and this change of position makes the analysis by the users complex and tedious.

## 2. Requirements

The Contractor shall develop a plug-in for the existing software. The required Plug-in shall meet the following requirements:

- a. Shall track the movement of the flies that are caught in the glue of the panels throughout a series of pictures (up to 2.000 images) and shall adjust the position of the respective mark accordingly. The variation of the position of the flies in between frames is always lower than 10mm.
- b. Shall be robust enough to support varying light conditions in the images that will be analysed. The images will have a resolution of 4,000 x 3,000 pixels. The background of the image will be homogeneous, although the light intensity may vary since the transects will be conducted in outdoors conditions. The blue target is framed by a black edge.
- c. Each fly shall be identified by a single id number and tracked through the set of images. The information of the geographic position (longitude/latitude) where the fly was caught shall be recorded in a csv file.
- d. The software shall run in Windows 7 and Windows 10 operating systems without the need of installation. The functionalities of the new plug-in shall be compatible and embedded in the current version of the software.



### 3. Information provided by the IAEA

A set of images collected in real conditions as well as access to existing version of the software (including code) will be provided to the Contractor.

### 4. Deliverables

The Contractor shall deliver the following items:

- a. Software Plug-in with the code that shall be the property of the International Atomic Energy Agency.
- b. Brief users' manual in English language.

### 5. Acceptance and testing

The Plug-in will be tested with sets of images obtained in real conditions. This set of images will be similar to those provided to the Contractor for the development of the Plug-in.