

	Technical Note	
	TESTING ELECTRONIC SCORING TARGETS (EST)	
	March 2013	ISSF HQ Munich, GER

1. Broadly, Testing is carried out in three circumstances:

- a. When a manufacturer applies for testing of a new EST system;
- b. When a manufacturer, having ISSF approval, modifies an EST to the extent that this may affect its accuracy;
- c. When a manufacturer, having ISSF approval, wishes to have its EST re-tested for approval for the next Olympic four year cycle; .

2. There are four levels of Test:

a. Phase 1 - Accuracy and Functionality

In this phase, a specified number of individual shots, that is large enough to provide statistical validity of the result, are fired at the target. The number varies according to the event for which the target is designed, because for example the rifle targets demand a higher accuracy than the pistol targets. The basic ISSF requirement for accuracy is: [ISSF Rule 6.3.2.2] "The accuracy requirement for EST is to score shots to an accuracy of at least one-half of one decimal ring...";

b. Phase 2 - Reliability in a Field Test for a competition (the series of ISSF events for which the target is designed);

c. Phase 3 - Suitability to conduct a complete competition (series of events) and to provide the Results in the standard ISSF format;

d. Olympic Cycle Four Year Re-tests

As stated above (in 1.c.) every EST system must be submitted for re-test towards the end of any Olympic Year in order for ISSF approval to be obtained for use in the next Olympic Four Year Cycle. These tests are extensive, but do not involve so many test-shots as for the initial Phase 1 tests.

Notes: Phase 1 and Phase 2 approval is required for EST to be used in the Qualification phases of ISSF competition events. Presently, only Sius AG has Phase 3 approval and Sius AG is under contract as the ISSF Results Provider.

3. Target Consistency. Each manufacturer must submit several targets of each model for the test. Those to be tested are selected at random by the Test Committee.

4. ISSF Ad Hoc Testing Working Group. The Working Group, selected by the ISSF Executive Committee have been as follows: David Parish (Member ISSF Executive Committee and formerly Chairman ISSF Technical Committee), Max Mueckl (Chairman ISSF Technical Committee), Derek Ivy (Member ISSF Administrative Council and EST Judges' Course Coordinator with electronic and statistical experience), Willi Grill (Member ISSF Rifle Committee), Ernst Adler (ISSF "A" Judge with Range Management experience), Dr (PhD) Michael Spiegel (Photogrammetry expert), Dr (PhD) Erik Anderson (Statistical and target

scoring expert) and from the outset Franz Schreiber (now ISSF Secretary General); demonstrating the importance that the ISSF places on the integrity of ISSF Approved EST.

5. The Accuracy Test (Phase 1) is conducted as follows:

- a. Several hundred aimed shots are fired from a gun at the correct distance from the target. A white strip or band is used, (or, for optical systems, placed in the plane of the aiming mask). Three high quality cameras are set up close to the target and reference points are affixed to the target frame. Before the start and after each shot a picture is taken of the face of the target by each of the three cameras. For each test-series the Log Print is provided by the manufacturer and the raw data also provided electronically in the IEEE 32-bit format on a memory stick. The strip or band is not moved until each shot has been photographed by each of the three cameras.
- b. The tests are conducted and supervised by members of the Ad Hoc Working Group. Detailed records and all material from the tests are kept.
- c. Then using photogrammetric analysis, the accurate location of each shot is measured. This location is compared with that of the location computed by the EST. Then the error between the location given by the EST and the cameras is calculated.
- d. Then two analyses are then produced:
 - a. The actual error, shot by shot, is plotted against the score value – by Dr Spiegel;
 - b. The predicted statistical error of the population, based upon the sample, is also evaluated – by Dr Anderson.

Separately, the raw data is provided for independent analysis by the Working Group Members.

- d. If both analyses show the EST to have met the accuracy criteria, then the target is recommended for approval; if both results show that the accuracy has not been met, then the target is not recommended for approval; if the two results are at variance, then the Committee decides the recommendation to be made - if necessary after more testing.

6. Approval. Approval is vested in the ISSF Executive Committee to whom the Working Group reports. The detailed Results are not disclosed other than to the Executive Committee for the obvious reasons associated with commercial confidentiality.

7. Publication of ISSF Approvals is on the ISSF Website.

End