Ultrasound Guidelines Council
Field Technician Study Guide
2012 Edition

Chapter VII – UGC Field Certification Procedures
Mike Tess

Introduction

UGC certification serves to identify professionals who are skilled in collecting high-quality ultrasound images on live animals under field conditions. The purpose of this chapter is to describe the procedures used to certify field technicians.

Equipment

Certification as a UGC Field Technician is linked to specific types of equipment. Equipment may be purchased from a variety of vendors, including all UGC-accredited labs. Persons considering purchasing ultrasound equipment are encouraged to check with UGC-accredited labs for advice.

Approved ultrasound machines in use in the United States include:
- Aloka 500 (old)
- Aloka 500 (new)
- Aquilla
- Classic

Approved frame grabbers include:
- CX100
- PXC200
- USB
- VCE

Approved image capturing systems include:
- BIA
- BIA-Pro+
- Black Box
- Black Box Pro
- CPEC
- CUP Box
- UICS
- Scanning Partner

Training
Training and experience in the operation and maintenance of ultrasound equipment and software are critical to obtaining high-quality images, and to gaining UGC certification. Each of the UGC-accredited labs offers professional training. Contact information for each lab is presented on the UGC website.

Proficiency Testing
To earn UGC-certification ultrasound technicians must pass proficiency testing (often simply referred to as Field Certification). UGC Field Certification programs are usually hosted by UGC labs in cooperation with a university. Proficiency testing includes:
- A written, open-book exam.
- Scanning 40 head of beef cattle (20 head twice)
  - Collecting ultrasound images at the following locations:
    - RIB – 1 or 2 images
    - IMF – 4 or 5 images
    - RUMP – 1 of 2 images

UGC Reference Field Technicians collect images on the same animals. All images collected are interpreted by UGC Reference Lab Technicians to yield estimates of ribeye area, rib fat depth, percent IMF, and rump fat depth. All images are scored for UGC Image Quality. Data from the Reference Field Technicians are used as the standards for each trait.

Statistics Used to Evaluate Proficiency
  Abbreviations
- IMF% = intramuscular fat percentage = also referred to as "Pfat" = the percentage of fat within the ribeye muscle.
- IMF = the location or the scan from which IMF is measured.
- IQ = image quality
- REA = ribeye area = the area of the ribeye muscle between and parallel to the 12th and 13th ribs
- RIB = the location or the scan from which REA and RIBFT are measured
- RIBFT = rib fat = the fat depth outside the ribeye muscle
- RMPFT = rump fat depth
- RUMP = the location or the scan from which RMPFT is measured

Each image collected is graded for image quality. The same scoring system is used by UGC-accredited labs to grade every ultrasound image submitted by UGC Field Technicians for use in beef cattle genetic evaluation. The three IQ categories are weighted as shown in the table below.

Classification	Acceptable	Marginal	Reject
Weight	1.00	0.50	0.00

The IQ score for a scan location is the average weighted score across all animals scanned in the test. For example, if a tech scanned 5 animals for RIB and the scans were graded as follows:

Animal	IQ Score	Weight
1	Acceptable	1.00
2	Marginal	0.50
3	Reject	0.00
4	Marginal	0.50
5	Acceptable	1.00

The Tech's IQ scored would be the average of the weights = (3.00/5) = 0.60. During proficiency testing each tech is required to scan 40 animals (20 head twice).

UGC standards for image quality during proficiency testing are presented below:

	RIB	IMF	RUMP
% Rejected	$\leq 15\%$	$\leq 15\%$	$\leq 5\%$
IQ Score	≥ 0.70	≥ 0.65	≥ 0.88

NOTE: For measures of REA, RIBFAT, RMPFT and IMF%, only images graded as acceptable or marginal are interpreted. Statistics used to evaluate these measures are described below.

Correlation = a measure of the degree of association between two variables. As used by UGC, correlations measure the association between predicted carcass measurements (i.e., via a tech's ultrasound scans) and the predicted carcass measurements made from scans collected by reference technicians. Correlation coefficients range between -1.0 and 1.0. Correlations close to these extremes indicate a very high degree of association between the variables. Correlations closer to zero indicate a low degree of association. Correlations computed by UGC are normally positive (i.e., between 0.0 and 1.0). Ideally, we want correlations to be high (i.e., as close to 1.0 as possible).

Bias = an average measure of how "far off" a tech's predicted measurements are from the true measurements (i.e., measurements made by reference techs). Ideally, we want bias to be as close to zero as possible.

Absolute bias = absolute bias is just like bias except that the sign is ignored (i.e., positive or negative), that's why we call it absolute bias. Ideally, we want absolute bias to be small.

Standard Error of Prediction (SEP) = a measure of the accuracy of a tech's predictions for the ultrasound measurements, again comparing the tech to the reference techs. SEP is a function of the variation in the group of animals scanned and the correlation. Ideally, we want the value for SEP to be small.

Repeatability = a measure of the degree of association between repeated measurements on the same animal. Repeatability may also be defined as the correlation between repeated measurements; and values for repeatability are presented and interpreted like those for

correlation. During proficiency testing, techs scan 20 animals twice. The more consistent a technician's technique, the higher the repeatability will be. Ideally, we want repeatability to be high (i.e., as close to 1.0 as possible).

Standard Error of Repeatability (SER) = a measure of the accuracy of repeated measurements on the same animal. Much like SEP is related to correlation, SER is related to repeatability. During proficiency testing, techs scan 20 animals twice. SER is computed from the differences between repeated scans on the same animals. Ideally, we want the value for SER to be small.

UGC standards for these statistics for proficiency testing are presented below.

	RIBFT	REA	IMF%	RMPFT
Correlation	≥ 0.90	≥ 0.85	≥ 0.85	≥ 0.90
Absolute Bias	≤ 0.05	≤ 1.00	≤ 0.70	≤ 0.02
SEP	≤ 0.05	≤ 1.00	≤ 0.70	≤ 0.05
Repeatability	≥ 0.90	≥ 0.80	≥ 0.80	≥ 0.90
SER	≤ 0.05	≤ 1.10	≤ 0.75	≤ 0.06

UGC Expectations
Ultrasound technicians who pass the proficiency testing are certified by UGC subject to the following commitments:
- Use only UGC approved systems for collecting images to be used in genetic evaluations of beef cattle.
- Participate in UGC-approved continuing education.
- Only submit images to UGC Labs that they have personally collected – i.e., they shall not submit under their name images collected by others.
- Allow UGC to collect image quality information from UGC Labs for the purpose of conducting image quality evaluations.

Continuing Education
Like most professional organizations, members are expected to continue learning in order to best serve their customers. The UGC Board of Directors is responsible for providing continuing education opportunities for UGC Field Technicians. The Field Tech Committee (composed of three experienced UGC Field Technicians appointed by the Executive Director) plays a major role in designing the educational programming directly offered by UGC.

Technicians that obtain or renew their UGC-Field Certification via on-site proficiency testing are primarily professionals who are either relatively new to the ultrasound business or scan cattle as a part-time enterprise. All UGC Field Certifications include a mandatory educational program which satisfies the continuing education requirements for these technicians during their two-year certification period.

Technicians that re-certify in absentia are professionals who have been certified for many years and usually scan thousands of animals per year. Beef cattle ultrasound is often their primary business. Continuing education requirements for absentia technicians can be met via choosing

from a menu of opportunities. Evaluation of completed educational experiences is made by the Executive Director in conjunction with the biannual re-certification process. During every two-year cycle absentia technicians must accumulate at least 4 points from the menu below:

- UGC sponsored interactive webinars – 1 pt each.
- UGC approved professional meetings – 1 pt each with a maximum of 2 per two-year cycle.
    - Beef Improvement Federation (BIF).
    - National Cattlemen's Beef Association (NCBA) or similar organization.
    - Regional or national American Society of Animal Science (ASAS) or similar organization.
    - Other industry/professional meetings as approved by the Executive Director.
- UGC sponsored on-site educational event – 4 pt.
- UGC Field Certification education program – 2 pt with a maximum of 1 per two-year cycle.
- UGC-approved educational programs offered by other organizations – pt determined by the Executive Director.

More details on the continuing education program are included in chapter IX.

Certification Renewal
All UGC Field Technician certifications are for two-year terms. From the date that certification is granted by UGC, the certification expires on December 31 of the year two years later. For example, if a technician earns certification on June 30, 2012, the term of that certification expires on December 31, 2014.

Technicians may renew their certification two ways: 1) via proficiency testing (described above), or 2) in absentia. In order to be re-certified in absentia, technicians must meet the following;

- Be currently certified.
- Have submitted images on at least 3,000 cattle to UGC-accredited labs with images scored for UGC Image Quality.
- Have scanned a minimum of 250 head per year with IQ data during the current certification period.
- Demonstrated IQ that meets or exceeds the thresholds presented in the table below.
    - Image quality standards apply to images submitted to UGC labs in 2011 and beyond.
    - Percentages shall be calculated based on all images submitted to all UGC labs during the current certification period.

Image Type	Percent Marginal	Percent Rejected
RIB	6.0%	0.6%
IMF	5.0%	0.5%
RUMP	1.0%	0.1%

Additional information on re-certification in absentia is presented in chapter IX.

Last Update - July 19, 2012