**Acoustic Impedance**
Product of density and velocity of sound in a particular material. The amount of reflection of a sound beam is determined by the difference in the impedances of the two tissues.¹

**Acoustic Power**
Quantity of energy generated by the transducer, expressed in watts. Also *transmit power*.¹

**Acoustic Scattering**
Reflections from small objects that are the size of the wavelength or smaller.²

**Acoustic Shadow**
Loss of echo signals from distal structures due to attenuation of overlying structures.²

**Acoustic Velocity**
The speed of sound through a medium as determined by the stiffness and density of the medium.
Also: speed of sound; propagation speed; sound velocity.³

**Aliasing**
A technical artifact occurring when the frequency change is so large that it exceeds the sampling view and pulse repetition frequency. The frequency display wraps around so that the signal is seen at both the top and bottom of the image.¹

**Amplitude**
Strength or height of the wave, measured in decibels.¹

**Amplitude mode (A-mode)**
A one-dimensional image displaying the amplitude strength of the returning echo signals along the vertical axis and the time (the distance from the transducer) along the horizontal axis.¹

**Anechoic**
Refers to a structure that returns no echoes. This could be a simple cyst or cystic structure such as the gall bladder, urinary bladder, or chambers of the heart. Also, *sonolucent, echo-free, echolucent, transonic*.⁴

**Attenuation**
Reduction in amplitude and intensity with increasing distance traveled due to scatter, reflection and absorption. Dependent on frequency; higher frequencies give less penetration.²

**Axial Resolution**
Depth resolution; ability to separate two objects lying in tandem along the axis of the beam.²

**Azimuthal**
The dimension perpendicular to the image slice, the thickness of the slice of anatomy.⁵

**Bandwidth**
The frequency range represented in a pulse from the transducer; *quality factor*.²
AACE Glossary of Ultrasound Terminology Continued

B-Scan
A two-dimensional cross-sectional image displayed on a screen in which the brightness of echoes and their position on the screen are determined by the movement of a transducer and the time it takes the echoes to return to the transducer. Also static scan.¹

Cineloop
The system memory stores the most recent sequence of images in a series of frames before the freeze button is pressed allowing a continuous loop of images to be reviewed.¹

Color Flow Doppler
Operating mode in which a two-dimensional image is generated that portrays moving reflectors in color simultaneously with B-mode images.²

Complex
Refers to a structure that is heterogeneous and may contain both cystic (fluid-filled) and solid components.¹

Compression
Regions of high pressure and density as sound travels through a medium.⁶

Crystal
The active transducer component that actually generates and receives ultrasonic energy by converting electrical impulses into sound waves and vice versa.¹

Cystic
A sac or pouch with a definite wall that contains fluid or semisolid material⁷

Decibel (db)
A unit used to express the intensity of amplitude of sound waves; does not specify voltage.¹

Density
Concentration of matter (mass per unit volume).⁶

Doppler Shift
The perceived frequency change that occurs dependent upon whether the source and listener are moving toward or away from one another.²

Dynamic Range
(Log Compression). The range of intensity from the largest to the smallest echo that the system can display.⁸

Echo
Reflected sound.³

Echogenic
Capable of producing echoes. Correlate with the terms hyperechoic, hypechoic and anechoic which refer to the quantity of echoes produced.⁹
AACE Glossary of Ultrasound Terminology Continued

**Echopenic**
Few echoes within a structure; less echogenic. Echo-poor. ¹

**Echolucent**
Without internal echoes; anechoic. ¹

**Edge Enhancement**
An electronic postprocessing function which makes contours of structures within the image more distinct and clear. ⁴

**Electronic Focusing**
Each crystal element within a group is pulsed separately to focus the beam at a particular area of interest. ¹

**Enhancement**
Because sound traveling through a fluid-filled structure is barely attenuated, the structures distal to a cystic lesion appear to have more echoes than neighboring areas. Also called through transmission. ¹

**Far Gain**
Control that affects the strength of the distant echoes in the image. ¹

**Focal Zone**
The depth of the sound beam where resolution is the highest. ¹

**Focusing**
The act of narrowing the beam to a small width at a set depth. ¹

**Footprint**
Shape of the transducer that is in contact with the patient. ¹

**Frame Rate**
Rate at which the image is refreshed in a real-time system display.¹

**Frequency**
The number of times in a given interval of time that a particular action occurs. ¹

**Gain**
Regulates the amplification (brightness) of returning echoes to compensate for loss of transmitted sound caused by absorption and reflection. ¹

**Gray Scale**
Display mode in which echo intensity is recorded as degrees of brightness or shades of gray. ⁹

**Hertz**
Unit for wave frequency (cycles per second); pulse repetition frequency (pulses per second); frame rate (frames per second). ³
AACE Glossary of Ultrasound Terminology Continued

**Heterogeneous**
Refers to an uneven echo pattern or reflections of varying echodensities. ⁹

**Homogeneous**
Refers to an even echo pattern or reflections that are relative and uniform in composition. ⁹

**Hyperechoic**
A relative term that refers to the echoes returned from a structure. Hyperechoic refers to a lesion or tumor which produces a stronger echo than surrounding structures or tissues. ⁴

**Hypoechoic**
Refers to structures that contain fewer or weaker echoes than surrounding tissues. ⁴

**Interface**
Surface forming the boundary between media having different properties. ²

**Isoechoic**
Refers to a lesion or tumor which produces an echo of the same strength as that of the surrounding structures or tissues. ⁴

**Kilohertz**
1000 hertz or $10^3$ cycles/s ²

**Lateral Resolution**
Ability to separate two objects that are positioned perpendicular to the axis of the ultrasound beam. Related to *beam width*. ²

**Linear Array**
Many small electronically coordinated transducers producing a rectangular image. ¹

**Megahertz (MHz)**
1,000,000 hertz ²

**Near Gain**
The amplification of echoes returning from the near field. ¹

**Noise**
Artifactual echoes resulting from too much gain rather than echoes from true anatomic structures. ¹

**Overall Gain Control**
Single gain control that increases amplification at all depths. ²

**Phased Array**
Electronically steered system where many small transducers are electronically coordinated to produce a focus wave front. ¹
AACE Glossary of Ultrasound Terminology Continued

**Piezoelectric Effect**
Electric current created by pressure forces. Certain types of ceramic materials can convert pressure to electricity and vice versa. Transducer elements utilize this phenomenon, which is also referred to as piezoelectricity. ⁴

**Persistence**
The accumulation of echo information over a specified period of time. ¹

**Power Doppler**
The presentation of two-dimensional Doppler information by color-encoding the strength of the Doppler shifts. Power Doppler is free of aliasing and angle dependence and is more sensitive to slow flow and flow in small or deep vessels. ⁶

**Pulse-echo Principal**
Sending pulses of ultrasound into the body so that they react with tissue and return reflections. ²

**Pulse Repetition Frequency (PRF)**
The number of times per second that a transmit-receive cycle occurs. ⁶

**Refraction**
Bending of waves as they pass from one medium to another. ²

**Resolution**
Ability to distinguish between two adjacent structures (interfaces). ¹

**Reverberation**
The phenomenon of multiple back-and-forth reflections created by two strong reflectors that causes the echoes to be misplaced in the display thereby representing a false image; ring-down effect. ²

**Scattering**
Redirection of ultrasound from a reflector which is small compared to the wave length of the beam. This occurs with rough surfaces or heterogeneous substances such as a solid organ. ⁴

**Shadowing**
Failure of the sound beam to pass through an object. ¹

**Slice thickness**
*Elevational resolution.* The size of the beam perpendicular to the image plane. ²

**Sonodense**
A structure that transmits sound poorly. ¹

**Spatial Resolution**
How closely positioned two reflectors can be to one another and still be identified as separate reflectors on an image display. *Reflector resolution.* ²
Speckle
Interference effects of the scattered sound from the distribution of scatterers in the tissue that is not related to the scattering properties of tissue (echo texture). Produces granular appearance.

Specular Reflectors
Reflections from surfaces, which are smooth, compared to the wavelength of sound thereby creating a bright echo on the monitor.¹

Stiffness
Resistance of a material to compression. Hardness.⁶

Temporal Resolution
The ability of a display to distinguish closely spaced events in time and to present rapidly moving structures correctly. Improves with frame rate.⁶

Texture
The echo pattern within an organ.¹

Time Gain Compensation (TGC) or Depth Gain Compensation
Control that compensates for the loss (attenuation) of the sound beam as it passes through tissue.¹

Transducer
An electromechanical device that is part of an ultrasound system. The device that contacts the patient and converts electrical energy into mechanical energy and vice versa.²

Wavelength
Distance a wave travels in a single cycle. As frequency becomes higher, wavelength becomes smaller.¹
AACE Glossary of Ultrasound Terminology Bibliography


2. Zagzebski, JA, Essentials of Ultrasound Physics, St. Louis, Mosby, 1996


