

VSAT Lexicon
Glossary of Terms

MICAN Communications Inc.
May 15, 2003

Item	Acronym	Term	Definition
1	Arc	Arc	See the Domestic Arc
2	async	Asynchronous	Asynchronous describes a communications strategy that uses start and stop bits to indicate the beginning and end of a character, rather than using constant timing to transmit a series of characters. Asynchronous communications methods are generally less efficient but more resistant to disruption than synchronous communications. Asynchronous methods are more efficient for situations in which traffic comes in bursts (rather than moving at a regular pace). Common examples of asynchronous communications devices are modems and terminals
3	ACP	Automatic Cross Polarization	A software driven process to aid in the rotational alignment of the feed on a satellite antenna
4	-	Az / El Mount	Antenna mount that requires two separate adjustments to move from one satellite to another.
5	Az	Azimuth	The left to right rotation of the antenna as it is aligned in relationship to the satellite in space. The angle of rotation (horizontal) that a ground based parabolic antenna must be rotated through to point to a specific satellite in a geosynchronous orbit. The azimuth angle for any particular satellite can be determined for any point on the surface of the earth given the latitude and longitude of that point. It is defined with respect to due north as a
6	Az / El	Azimuth over Elevation	The azimuth over elevation bearing used to aim the antennas at the satellite's orbital slot in space
7	BW	Bandwidth	The Bandwidth refers to the amount of data a cable can carry; measured in bits per second (bps) for digital signals, or in hertz (Hz) for analog signals such as sound waves. The range of frequencies over which signal amplitude remains constant as it is passed through a system, or, a measure of the information carrying capacity of a communications channel, or the amount of the electromagnetic spectrum that a given signal occupies; the higher (wider) the bandwidth, the greater the information; usually expressed in Kilohertz (thousands of Hertz, or KHz) or Megahertz (millions of hertz, or MHz).
8	BB	Baseband	In networking, a baseband connection is one that uses digital signals, which are sent over wires without modulation; that is, binary values are sent directly as pulses of different voltage levels rather than being superimposed on a carrier signal (as happens with modulated transmissions).
9	-	Beamwidth	The angle or conical shape of the beam the antenna projects. Large antennas have narrower beamwidths and can pinpoint satellites in space or dense traffic areas on the earth more precisely. Tighter beamwidths thus deliver higher levels of power and thus greater communications performance.
10	-	Bearing	

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11	BER	Bit Error Rate	Fraction of a sequence of message bits that are in error. A bit error rate of 10^{-6} means there is an average of one error per million
12	-	Carrier	The basic radio, television, or telephony centre of frequency transmit signal. The carrier in an analog signal. is modulated by manipulating its amplitude (making it louder or softer) or its frequency (shifting it up or down) in relation to the incoming signal. Satellite carriers operating in the analog mode are usually
13	C / N	Carrier to Noise	The ratio of the received carrier power and the noise power in a given bandwidth, expressed in dB. This figure is directly related to G/T and S/N; and in a signal the higher the C/N, the better the
14	C / T	Carrier-to-noise-temperature	Carrier-to-noise-temperature ratio.
15	-	Cassegrain Antenna	The antenna principle that utilizes a subreflector at the focal point which reflects energy to or from a feed located at the apex of the main reflector.
16	C-Band	C-Band	Band of frequencies used for satellite and terrestrial communications. Range of frequencies from 4 to 6 gigahertz (billion cycles per second) is used by most communications satellites. 3.7 to 4.2 GHz satellite communication band is used as the downlink frequencies in tandem with the 5.925 to 6,425 GHz band that serves as the uplink. Requires larger ground antennas,
17	Ch	Channel	A channel is a physical or logical path for a signal transmission. Channel frequencies are specified in the United States by the Federal Communications Commission and in Canada by Industry Canada. In telecommunications, a single cable may be able to provide multiple channels.
18	CP	Circular Polarization	Unlike many domestic satellites which utilize vertical or horizontal polarization, the international Intelsat satellites transmit their signals in a rotating corkscrew-like pattern as they are down-linked to earth. On some satellites, both right-hand rotating and left-hand rotating signals can be transmitted simultaneously on the same frequency; thereby doubling the capacity of the satellite to carry communication channels.
19	-	Clarke Belt	That circular orbit in space 22,237 miles from the surface of the earth at which geosynchronous satellites are placed. This orbit was first postulated by the science fiction writer Arthur C. Clarke in Wireless World magazine in 1945. Satellites placed in these orbits, although traveling around the earth at thousands of miles an hour, appear to be stationary when viewed from a point on the earth, since the earth is rotating upon its axis at the same angular rate that the satellite is traveling around the earth.
20	CIR	Committed Information Rate	CIR, Committed Information Rate, is the assurance from the network to the connected device of the network bandwidth
21	CW	Continuous Wave	Signal consisting of a single frequency. CW is used in testing satellite modems & antennas testing by the satellite operation.

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22	Cross Pol	Cross Polarity	The rotational alignment of the feed as it relates to the vertical and horizontal alignment of the satellite. Misalignment of the cross pol can cause significant problems and will seriously reduce the ability of the earth station to receive and transmit to the satellite
23	DBS	DBS	Direct Broadcast Service like Bell ExpressVu
24	dB	Decibel	The standard unit used to express the ratio of two power levels. It is used in communications to express either a gain or loss in power between the input and output devices
25	dBi	Decibel in Isotropic	The dB power relative to an isotropic source.
26	dBw	Decibel in Watts	The ratio of the power to one Watt expressed in decibels.
27	Dec	Declination	The offset angle of an antenna from the axis of its polar mount as measured in the meridian plane between the equatorial plane and the antenna main beam.
28	-	Delay	The time it takes for a signal to go from the sending station through the satellite to the receiving station. This transmission delay for a single hop satellite connection is very close on one-quarter of a
29	Demod	Demodulation	Process of retrieving an information modulated on a carrier.
30	Arc	Domestic Arc	An imaginary arc in space where all of the fixed geosynchronous satellites are parked at either two or eight degree increments depending upon the type of polarization, Normally thought of as an arc of orbital slots extending from 69 degrees (west) to 138 degrees (west) when in North America
31	D / L	Downlink	A satellite receive system that processes satellite delivered information, and includes the satellite itself, the receiving earth station and the signal transmitted downward between the two.
32	ESA	Earth Station	The term used to describe the combination or antenna, low-noise amplifier (LNA), down-converter, (or an LNB) and receiver electronics. It is used to receive a signal transmitted by a satellite. Earth Station antennas vary in size from the 2 feet to 12 feet (0.6 meter to 3.8 meters) diameter size used for VSAT reception to as large as 100 feet (30 meters) in diameter sometimes used for international communications.
33	EIRP	Effective Isotropic Radiated Power	This term describes the strength of the signal leaving the satellite antenna or the transmitting earth station antenna, and is used in determining the C/N and S/N. The transmit power value in units of dBw is expressed by the product of the transponder output power and the gain of the satellite transmit antenna.
34	El	Elevation	The north to south rotation of the antenna as it is aligned in relationship to the satellite in space. The upward tilt to a satellite antenna measured in degrees required to aim the antenna at the communications satellite. When aimed at the horizon (plane of the Earth's surface at your location), the elevation angle is zero. If it were tilted to a point directly overhead (perpendicular to the plane of the Earth), the satellite antenna would have an elevation of 90

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35	-	Feed	This term is used to describe the feed system of an antenna. The feed system may consist of subreflector plus a feedhorn or a
36	-	Feedhorn	Satellite receiving antenna component that collects the signal reflected from the main surface reflector and channels this signal into the low-noise amplifier (LNA) or low-noise block
37	FL	Focal Length	Distance from the centre feed to the centre of the dish.
38	-	Focal Point	Area toward which the primary reflector directs and concentrates the signal received.
39	-	Footprint	Map of signal strength showing EIRP contours of equal signal strengths as they cover the earth's surface. Different satellite transponders on the same satellite often have different footprints of the signal strength. The accuracy of EIRP footprints or contour data can improve with the operational age of the satellite. Actual EIRP levels of the satellite, however, tends to decrease slowly as the spacecraft ages
40	FEC	Forward Error Correction	Adds unique codes to the digital signal at the source so errors can be detected and corrected at the receiver. Technique that uses redundant information passed with the actual data to detect and correct errors without any retransmission of the data bits in error. Several standard FEC types exist within the communications systems, including Trellis, Viterbi, Sequential, and Viterbi / Reed Solomon concatenated
41	F	Frequency	The number of times that an alternating current goes through its complete cycle in one second of time. One cycle per second is also referred to as one hertz; 1000 cycles per second, one kilohertz; 1,000,000 cycles per second, one megahertz; and 1,000,000,000 cycles per second, one gigahertz
42	FSS	FSS	Fixed Satellite Service like Anik or Galaxy satellites
43		Gain	A measure of amplification expressed in dB. In electrical signalling, an increase in a signal's voltage, power, or current. This type of increase can occur only through amplification. Noise caused by a momentary increase in signal amplitude is called a gain
44	G / T	Gain over Thermal Noise	A figure of merit of an antenna and low noise amplifier combination expressed in dB. "G" is the net gain of the system and "T" is the noise temperature of the system. The higher the number, the better the system.
45	G4R	Galaxy G4R	A hybrid FSS geosynchronous satellite offering both 24 C-Band and 32 Ku-Band transponders
46	GHz	Gigahertz	See Frequency. One billion cycles per second. Signals operating above 3 Gigahertz are known as microwaves...above 30 GHz they are know as millimetre waves. As one moves above the millimetre waves signals begin to take on the characteristics of Lightwaves.
47	-	Geostationary Orbit	Refers to a geosynchronous satellite angle with zero inclination. so the satellite appears to hover (at an altitude of approximately 22,300 miles) over one spot on the earth's equator.

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48	Geo	Geosynchronous	The Clarke circular orbit above the equator, such as the orbit of a communications satellite. A satellite in geosynchronous orbit is known as a geosynchronous or geostationary satellite. The orbit is “synchronous” because the satellite makes a revolution in about 24 hours. The satellites are about 36,000 kilometers (22,350 miles) above the earth, and they appear to be stationary over a location.
49	GMT	Greenwich Mean Time	The time at the Greenwich observatory. This is generally used as the reference time when a standardized value is needed. This official name has been changed to UTC (a premuted acronym for Universal Coordinated Time).
50	Hz	Hertz	See Frequency. Basic measure of radio frequency characteristics. An electromagnetic wave completes a full oscillation from its positive to its negative pole and back in what is called a cycle. A single Hz is equal to one cycle per second.
51	Hub	Hub Network operations centre (NOC)	All communications to, from, and between micro terminals must flow through the hub. Or a point or piece of equipment where a branch of a multipoint network is connected. In a telegraph network, signals appear as dc pulses at the hub. A network may have a number of geographically distributed hubs or bridging
52	HNS	Hughes Network Services	The world's largest provider of services and systems in the VSAT marketplace
53	-	Hybrid Satellite	Satellite that carries two or more different communication payloads (i.e. it supports both C-band & Ku-band transponders).
54	Inc.	Inclination	The angle between the orbital plane of a satellite and the equatorial plane of the earth.
55	IRU	Indoor Receive Unit (Modem)	The receive modem
56	ITU	Indoor Transmit Unit (Modem)	The transmit modem
57	IFL	Interfacility Link	refers to the cable that connects the indoor unit with the outdoor
58	IF	Intermediate Frequency	Generally, it is either 70 MHz or 140 MHz.
59	ITU	International Telecommunication Union	International Telecommunication Union technical satellite committee
60	Ka	Ka-Band	The frequency range from 18 to 31 GHz.
61	KHz	Kilohertz	Refers to a unit of frequency equal to 1,000 Hertz.
62	Ku-Band	Ku-Band	A band of frequencies that are used with VSAT systems range from 11 GHz to 15 GHz used to transmit and receive signals from satellites. The band actually ranges in a frequency range from 10.9 to 17 GHz. Requires smaller ground antennas, usually four feet (1.2 meter) in diameter.
63	Lat / Long	Latitude / Longitude	A location on a map that identifies the site of the VSAT installation and is express in degrees, minutes, seconds (DDD, MM, SS) or decimal degrees (DD.DDDD)
64	L-Band	L-Band	The frequency range from 0.5 to 1.5 GHz. Also used to refer to the 950 to 1450MHz used for mobile communications.
65	LOS	Line-of-sight	Line-of-sight

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66	Dev	Local Magnetic deviation	The local difference between the true north and the magnetic north and is the amount the will affect a compass needle in either a positive or negative deviation. It also changes annually.
67	LOS	LOS	Line-of-sight
68	LNA	Low Noise Amplifier	This is the preamplifier between the antenna and the earth station receiver. For maximum effectiveness, it must be located as near the antenna as possible, and is usually attached directly to the antenna receive port. The LNA is especially designed to contribute the least amount of thermal noise to the received signal.
69	LNB	Low Noise Block Downconverter	A device that converts the extremely low power satellite signals to a higher voltage and at the same time block converts the signals to the L-Band frequency range. A combination Low Noise Amplifier and downconverter built into one device attached to the feed.
70	M	Magnetic North	The location near the north pole where a compass needle with point. It moves around on an annual basis. See local magnetic
71	-	Margin	The amount of signal in dB by which the satellite system exceeds the minimum levels required for operation.
72	MHz	Megahertz	See Frequency. Frequency equal to one million Hz, or cycles per second.
73	-	Mesh	Network architecture wherein each node has the ability to communicate with every other node. In such a system, the number of potential communications paths = $N * (N - 1) / 2$.
74	-	Modulation	Process of manipulating the frequency or amplitude of a carrier in relation to an incoming video, voice, or data signal.
75	-	Mount	A structure, usually 3-4' in height that attaches to a building roof, parapet or tower and has the proper size pipe or hardware to secure a microwave or satellite dish or any other antenna not suitable for direct attachment.
76	MCPC	Multiple Channels Per Carrier	Communications architecture that multiplexes channels of information in the time domain onto a single carrier (frequency
77	-	Offset	A type of centre fed antenna design used for smaller aperture antennas where the feed is offset approximately 21.5 degrees from the centre line of the reflector
78	OPI	Outdoor Pointing Indicator	
79	-	Polar Mount	Antenna mechanism permitting steering in both elevation and azimuth through rotation about a single axis. While an astronomer's polar mount has its axis parallel to that of the earth, satellite earth stations utilize a modified polar mount geometry that incorporates a declination offset.

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80	Pol	Polarization	Design technique used to increase the capacity of the satellite transmission channels by reusing the satellite transponder frequencies. In linear cross polarization schemes, half of the transponders beam their signals to earth in a vertically polarized mode; the other half horizontally polarize their down links. Although the two sets of frequencies overlap, they are 90 degree out of phase, and will not interfere with each other. To successfully receive and decode these signals on earth, the earth station must be outfitted with a properly polarized feedhorn to select the vertically or horizontally polarized signals as desired. In some installations, the feedhorn can receive vertical and horizontal transponder signals simultaneously, routing them into separate LNBS for delivery to two or more satellite receivers. Unlike most domestic satellites, the DBS series use a technique known as left-hand and right-hand circular polarization. Technique used by the
81	QPSK	Quadrature Phase Shift Keying	Digital modulation scheme used in transmission communications to allow increased sending capacity.
82	RFI	Radio Frequency Interference	Interference which occurs when an earth station aimed at a distant satellite picks up a second, often stronger signal, from a local telephone terrestrial microwave relay transmitter. Microwave interference can also be produced by nearby radar transmitters as well as the sun itself. Relocating the antenna by only several feet will often completely eliminate the microwave interference. Denotes apparent disturbance or distortion to satellite signals.
83	-	Rain Outage	Loss of signal at Ku or Ka Band frequencies due to absorption and increased sky-noise temperature caused by heavy rainfall.
84	Rx	Receiver	An electronic device which enables a particular satellite signal to be separated from all others being received by an earth station, and converts the signal format into a format for video, voice or data.
85	Sat	Satellite	A sophisticated electronic communications relay station orbiting 22,237 miles above the equator moving in a fixed orbit at the same speed and direction of the earth (about 7,000 mph east to west)..
86	-	Saturation	A condition that exists when a further change in the input produces no additional output (a saturated amplifier).
87	-	Shared Hub	Satellite communications operations centre that is shared among several separate network users; often used for VSAT operations.
88	SCPC	Single Channel Per Carrier	Communications architecture that places one source of information onto a single carrier (frequency domain). Economical ways to get multiple signals on one transponder.

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89	Survey	Site Survey	Looks at the proposed mounting structures (buildings, towers, etc.) and determines their suitability for the antennas being proposed and considers the prospect of getting the cables / power from the antenna to the indoor equipment as well as the mounting of the indoor equipment. it also encompasses looking at the entire path both physically for trees, buildings, water towers, mountains, etc., and on a topographic map (either paper or electronic) and looking for obvious obstructions and anything that might be in the path or in the nearby path that will affect the beam.
90	-	Skew	An adjustment that compensates for slight variance in angle between identical senses of polarity generated by two or more
91	-	Slot	That longitudinal position in the geosynchronous orbit into which a communications satellite is "parked." Above the North America, communications satellites are typically positioned in slots which are based at two to three degree intervals.
92	-	Solar Outage	Solar outages occur when an antenna is looking at a satellite, and the sun passes behind or near the satellite and within the field of view of the antenna. This field of view is usually wider than the Beamwidth. Solar outages can be exactly predicted as to the
93	SSPA	Solid state power amplifier	A VSLI solid state device that is gradually replacing Traveling Wave Tubes in satellite communications systems because they are lighter weight and are more reliable.
94	-	Spectrum	The range of electromagnetic radio frequencies used in transmission of voice, data and television.
95	-	Symbol rate	The number of symbols that are transmitted as opposed to the number of bits. It is common when using spectrum efficient modulation techniques that more symbols are passed per hertz then is normal - 1:1 ratio
96	Sync	Synchronous	The process of orienting the transmitter and receiver circuits in the proper manner in order that they can be synchronized. Home television sets are synchronized by an incoming sync signal with the television cameras in the studios 60 times per second. The horizontal and vertical hold controls on the television set are used to set the receiver circuits to the approximate sync frequencies of incoming television picture and the sync pulses in the signal then fine tune the circuits to the exact frequency and phase.
97	TPDR	Transponder	The antenna-like part of the communications satellite that receives signals from the earth, translates and amplifies them, and retransmits them back to earth. Satellites have numerous transponders, typically 32.
98	T	True North	The actual location of the north pole as opposed to the location of the magnetic north which is where a compass needle will point
99	U / L	Uplink	Transmitting to a satellite for relay. Also earth station used to transmit signals to a satellite

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100	VSAT	Very Small Aperture Terminal	The name of the industry that uses small Ku-Band antennas to receive and transmit data from the end user to the hub location. Also - Very Small Aperture Terminal - Small earth stations, usually 0.75 meter to 1.8 meter in diameter (antenna dish sizes from 0.6 meter to 3.8 meter in diameter can also be used as Very Small Aperture Terminals). Means of transmission of video, voice, and data by SCPC, TDM/TDMA, or DAMA to a satellite. Used in business applications. Small aperture terminals under 0.5 meters are sometimes called Ultra Small Aperture Terminals
101	-	Viterbi	A common form of FEC used in VSAT systems
102	VWSR	Voltage Standing Wave Ratio	A measurement of mismatch in a cable, waveguide, or antenna system.
103	W/G	Waveguide	A rectangular or elliptical tube used for transmitting microwave frequencies between the indoor electronics to antenna on top of tower/building, etc. - usually 2Ghz and up. Coax and heliax generally have too high a loss to be used at these frequencies.