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From: Bill Dexter

TECHNICAL BULLETIN

Re: **Radio Communications - Analog versus Digital**

The DFA Telemetry System communicates on the normally used telemetry systems bands of VHF (150 to 174 MHz) and UHF (450 to 470 MHz and 900 MHz) and utilizes a 600 or 1200 baud analog radio versus the communication speed of other systems using the 9600 baud digital radio.

Fact #1.

The 9600 baud digital radio is more sensitive to noise than any analog radio system. The reason is a digital signal cannot be filtered and must be allowed to come through at full speed. As the digital signal gets closer to the noise level, a single pop or glitch in the signal can be interpreted as a 1 or a 0 thus ending a good signal.

In the analog system, there are two audio frequencies that can be filtered. These frequencies represent either a 1 or a 0. Since the noise on a radio system is usually either much higher or much lower than the 1 or 0 frequencies, the analog radio signal is received by the modem intact regardless of high noise levels.

The digital system overcomes noise problems by sending the message three or more times to compare the message packets. Effectively, this results in a digital radio baud rate not of 9600 but 3200 or less.

Fact #2.

In a digital system, when the noise level gets too high the digital radio stops working due to multiple hits in a message. In an analog system, even when the noise level is equal to the signal strength, the analog signal usually gets through. This fact accounts for the DFA Radio Telemetry Systems ability to operate at distances and in conditions that the digital radio can not. In the end, this makes the analog communication speed virtually the same as the digital with much less infrastructure and greater reliability.

Fact #3.

Several DFA customers have 'mixed' systems and have, in a few cases, asked to convert to our system (an analog system) because of problems like rain, wind and dust that make the digital system unreliable. Above 450 MHz is a radar signal and the signal bounces off and back.

Also, many customers have had difficulty finding experienced people to provide service for digital radios. The DFA specified radio is an off-the-shelf standard VHF or UHF radio serviceable or replaceable by local communications shops.

Fact #4.

The digital radio is more expensive than the analog radio that DFA uses. One digital radio I priced was \$666.00. To add store-and-forward to the digital radio was an additional cost of \$495.00 per radio!!!! The DFA specified analog radio is \$520.00 with store-and-forward capability as a standard radio feature.

Fact #5.

The DFA Radio Telemetry System is NOT tied to any one type of radio or frequency spectrum. The DFA controller card has a straight serial port and any radio that can be connected to a serial port and has communications handshaking can be connected to a DFA System regardless of the baud rate or frequency.

In conclusion, for utility grade communications, the more reliable lower speed analog communication methodology provides an overall better communications base than does the higher speed digital radio communications...even though in today's market it doesn't sound as exciting or new age....It just works better!

Bill Dexter