Purpose of Demonstration

The purpose of this demonstration is to demonstrate the capabilities of IMSAR's radar for the United Stated Custom and Boarder Protection Agency (CPB). This is a manned mission on aircraft and flown at or below 14,000 MSL.

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Company and Technology Background

IMSAR LLC has radar technology that is able to track moving targets, image the surface of the earth, create digital elevation maps, assist in search and rescue operations, and detect small changes in a scene, such as the movement of a vehicle. Various branches of the US military, including the Navy, Army, and Air Force, as well as some commercial businesses, have expressed interest in this technology. The size, weight, power, and cost of IMSAR's Synthetic Aperture Radar (SAR) system, known as NanoSAR, are an order of magnitude less than similar systems.

IMSAR performs SAR tests from a small aircraft typically flying between 2,000 and 10,000 feet in altitude (above ground level). Directional transmit and receive antennas are nominally pointed toward the earth. Reflected signals are collected and processed to create images of the ground. Transmission is a linear frequency modulated continuous wave (LFM-CW), or a "chirp," with the frequency being swept from the minimum to the maximum frequency 1000 times per second. A chirp signal is illustrated in Figure 1. Because the frequency sweeps are very rapid, the average power at any given frequency is extremely low, as is the likelihood of detection by (i.e., interference to) ground based systems operating in the same frequency range.

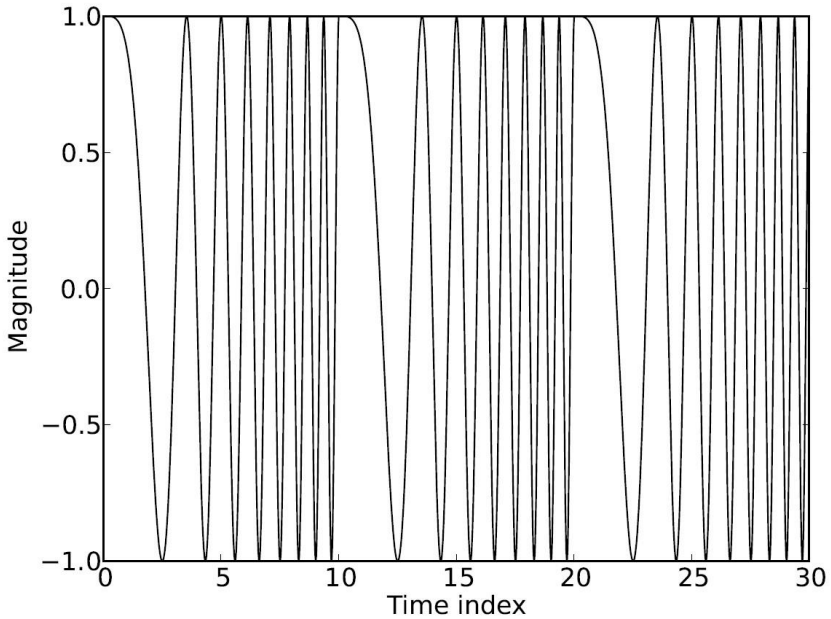

Figure 1. Example LFM chirp signal, increasing in frequency from left to right, then repeating.

The Ku-band system typically operates with a contiguous bandwidth of 1500 MHz, and can be programmed to operate anywhere between 15.4 and 17.7 GHz. The system is not currently capable of notching in the middle of the 1500

MHz band. Therefore, if a potential conflict is present, the transmission frequencies must be moved to a different portion of the 15.4-17.7 GHz band, or the bandwidth reduced. The system can operate with a reduced bandwidth (< 1500 MHz), but the imaging capabilities are reduced proportionately. An example of the geometry of a SAR is shown in Figure 2.

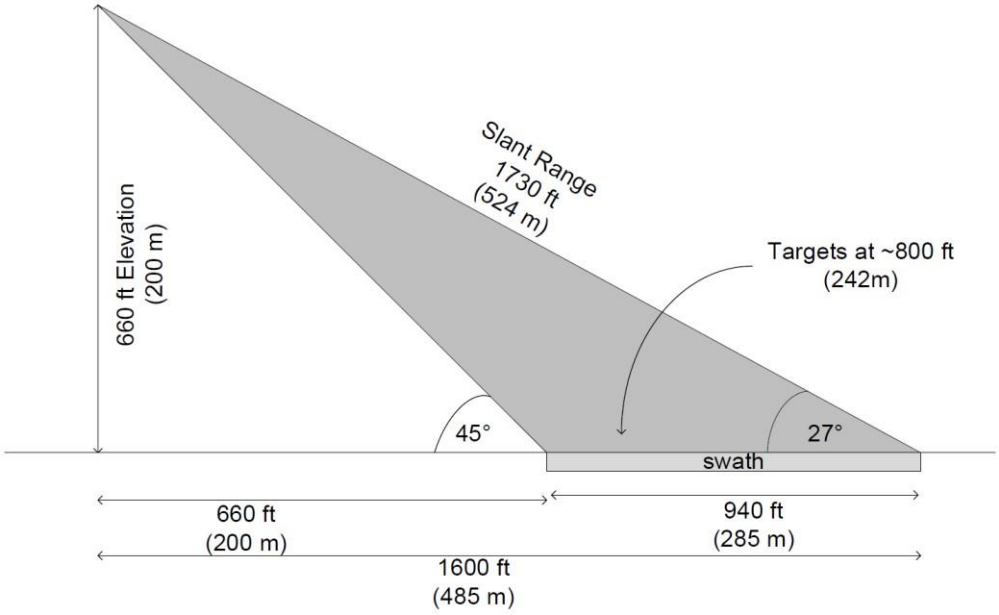

Figure 2. Example SAR geometry, from an airborne platform.