7.3.4.1 System Trade-offs (Continued)

Target parameters include radiometric as well as spatial parameters. The targets radiometric size and its scintillation properties are beyond the control of the Paxsat designer. Reference [58] lists some typical early communication satellite radar cross sections, calculated by RCA from a project known as TRADEX. No data has been discovered on satellite scintillation or glint. In any case, radiometric properties can be a sensitive function of frequency. For the purpose of comparison in this study, targets were assumed to have a constant (swirling type '0') 5 m^2 cross section. Spatial target characteristics include the targets true relative position and dynamics as well as the uncertainty in target position. These parameters will drive system parameters such as search volume, etc.

System requirements include the data required from the radar and the envelope of resources available to the radar. In any final design, these will be subject to a number of trade-offs viz-a-viz optimizing the entire satellite sensor platform with all its various demands and facilities.

Radar parameters characterize and are chosen so as to meet the system requirements for all targets of interest. Included under radar parameter is the choice of technology for implementing the radar. In practice, availability, cost and reliability of technology also steer the radar design towards preferred configurations and limit acheivable system performance.

One of the most fundamental choices of radar parameter is the operating frequency.

Two different constraints can affect the results of a frequency trade-off, constraints on beamwidth and constraints on aperture.

If a particular beamwidth is required, then as frequency increases so does the required power. If a particular aperture is available, then as frequency increases, power decreases.