

6. The elements listed in Figure 1 form the basis of comparison between competitive systems which meet both the technical and operational Requirements Specifications.

The sensors must be evaluated in terms of:

- a. Contractor's Performance Specifications (ie. intended and existing roles from other users, operating modes, resolution);
- b. Reliability and Maintainability (ie. Mean Time Between Failures, past history);
- c. Recording Medium (ie. film type/size, video formats/recorders, processing requirements);
- d. Inter-system needs (ie. SAR and Navigation interaction);
- e. Cost; and
- f. Risk.

Figure 1. Sensor Evaluation

7. After all things are considered, the "short list" of sensors would ideally be tested and their performance compared, before the final sensor selection is made. The sensors should first be evaluated in a laboratory for the performances outlined in Figure 2.

- A. Aerial Cameras - Test optical resolution (lens resolution & lens focal length) using a "bar chart" or electronic Modulation Transfer Function (MTF) equipment. Both the camera and lenses must be tested both on and off axis.
- B. Electro-Optic Sensors - Test optical resolution of lenses (same way as cameras) which can then be compared with the theoretical detector resolution to determine the overall theoretical sensor resolution. Since in these sensors, the film has been replaced by detectors, the resultant video signal can be recorded. The recording equipment, including tapes, must also be tested in terms of imagery degradation effects.
- C. Infrared Sensors - Measure resolution via the subjective measurements of Minimum Resolvable Temperature Difference (MRTD) tests. These tests use standard 4-bar targets, blackbody sources, and collimators under computer controlled conditions to combine the spatial and temperature resolution of the system in the correct way (albeit subjectively). The parameters measured include the MTF (system's ability to recreate the spatial frequency content of a scene), Noise Equivalent Temperature Difference (temperature difference between large objects in a scene required to produce a unity