Multi-perspective imaging and image interpretation

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High resolution range profiling and imaging have been the principle methods by which more and more detailed target information can be collected by radar systems. The level of detail that can be established may then be used to attempt classification. In this tutorial methods for achieving very high resolutions will be reviewed and in particular how multiple perspectives can be exploited. The techniques will include wide instantaneous bandwidths, stepped frequency, synthetic aperture synthesis and tomography. Examples showing the angular dependency of high range resolution profiles and two-dimensional imagery of real, full scale targets will be shown. This data is then examined as a basis for target classification and highlights how features observed relate to the structures that compose the target. A number of techniques will be introduced including statistical based and neural based approaches. These will lead into a new method of classification that exploits multiple perspectives. Results will be presented, again based upon analysis of real target signatures.