reach targets beyond the horizon, and return back to the radar by the same reflected path. Thus the line of sight limitation does not apply to these specially designed "Over-the-Horizon" radars. This technique is of limited use in the Arctic regions due to the erratic behaviour of the ionosphere. A more detailed explanation of Over-The-Horizon radar can be found in Annex A.

The line-of-sight limitation is particularly severe for installations at ground level attempting to detect aircraft flying at low altitude. Unless the site is at the top of a dominating hill, a low flying aircraft will be below the radar's horizon unless the plane comes close to the site, and even then a fast moving aircraft will remain in view for only a very short time.

Resolution and Field of View

Optical design using long focal lengths allows the image recorded by a photographic or television camera to be magnified to any scale, although, for a given size of picture, greater magnification comes at the expense of displaying a smaller area of actual territory. As with a choice of maps of a given real size, one can show a large area on a small scale, or a smaller area magnified to a larger scale. However there are practical limits to the degree of magnification that is useful. Higher magnification spreads the received light over a larger area, and therefore reduces the brightness of the image, making it more difficult to recognize detail. Brightness can be increased by using a larger collecting lens, but large lenses are expensive, heavy,[20] and introduce optical aberrations of their own. The final limit to the ability to resolve the details of an image, posed by the phenomenon of

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[20] For example, the Hubble Space Telescope launched on 24 April 1990, weighs approximately 1,200 kilograms (and costs about $2 billion). "Discovery Flies Unique Trajectory to Achieve Record Shuttle Altitude," *Aviation Week & Space Technology*, 30 April 1990, p. 23.