

The Design Of A Dedicated Observatory For Optical SETI

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An earth located facility has been specifically designed for optical SETI. The requirements include no imaging which greatly reduces the cost of a large mirror area system, but also requires sensitive short pulse detection apparatus, significant computer analysis, and a fast star acquisition system for pointing the complete receiver system.

The system is specifically designed to look for short pulse signals which are the most likely modulation approach in the optical spectrum because of the low resultant optical background noise in each short measurement period and the large number of bits per pulse available for a very low duty cycle system.

The low background due to time slots of nanoseconds enables large receiving area photon collectors to be utilized and not use narrow optical filters thus enabling a more efficient search. The lack of imaging resolution is not important as long as the signal can be focused in a spot the size of the detector's photosensitive area, and the field-of-view does not include other stars.

Large segment low-cost mirrors are feasible and do not require an adaptive real-time alignment control to achieve the necessary accuracy. A 14 ft. diameter optical system/made up of 18 hexagonal mirror segments, has been designed which can be mechanically steered at speeds to enable rapid pointing from one star system to another in seconds. Each mirror is 32 inches in diameter. The full design is presented with an explanation of each requirement.