COMBINED OPTICAL SYSTEM FOR SCIENCE IMAGING AND HIGH RATE DATA RETURN FROM A SMALL SPACECRAFT

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ABSTRACT

Space missions of the future must gather more science information than earlier target- body, preview missions and must do this using a new class of smaller and lighter-weight spacecraft. One way to minimize the size and weight of these vehicles is to combine multiple functions into a single instrument package. Another way is to use optical communications for data return, rather than the larger and more bulky radio frequency systems, We present the results of a design study to combine the functions of optical high-resolution imaging, optical multi-spectral imaging and optical communications data return into a single integrated package. This combined instrument has the capability to collect and return imaging science data using a single optical telescope and a shared focal plane region, Many of the processing elecrtonics can also be shared. Comparisons, in terms of estimated mass, size and power consumption, are made with the conventional approach of using separate instruments for each of these functions.