

# **SYSTEM DESIGN FOR Nd:YAG LASER COMMUNICATIONS**

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## **ABSTRACT**

This paper describes key design issues and tradeoffs in Nd:YAG laser communications system design. As background, it reviews missions and applications contemplated for Nd:YAG technology. It also briefly summarizes receiver operation, focusing on the primary beamsteering functions that enable accurate pointing of the very narrow communications beam ( $5 \mu\text{rad}$  for a one gigabit per second link). The remainder of the paper considers Nd:YAG lasercom system design methods. The paper reviews typical system specifications (e.g. data rate, margin, and acquisition time) and constraints (such as platform dynamics and laser capabilities). It shows how the designer makes tradeoffs among tracking accuracy, control bandwidths, fields of view, signal to noise ratio and transmitted beamwidth to iterate to a final choice of design parameters, and it describes examples of resulting designs.