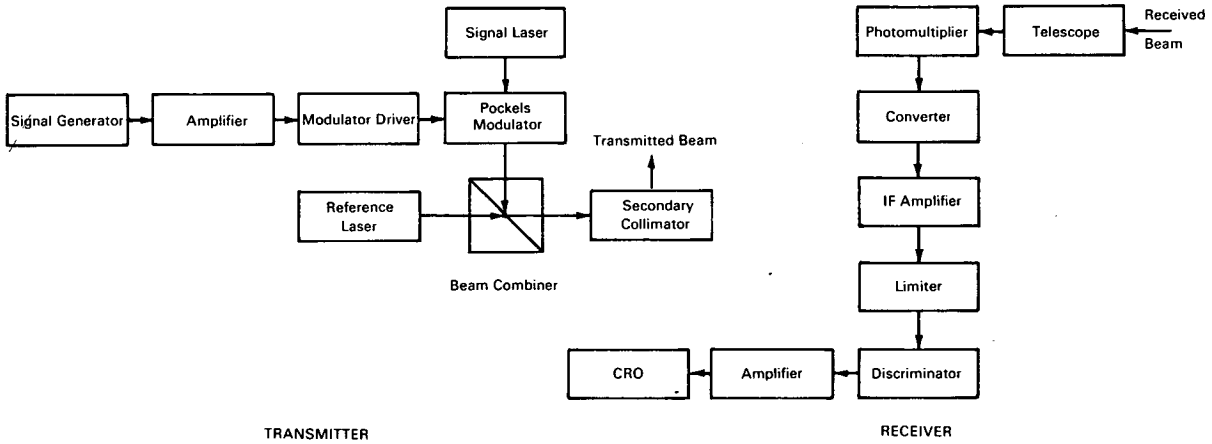
NASA TECH BRIEF

Laser Communication System Is Insensitive to Atmospherically Induced Noise



The problem:

To develop an optical communication system that is insensitive to atmospherically induced amplitude noise fluctuations and phase distortions.

The solution:

An angle modulated transmitted reference heterodyne laser communication system. The block diagram shows an implementation of the system for single-frequency subcarrier modulation.

How it's done:

The modulation waveform (intelligence) derived from the signal generator, is amplified and applied to a Pockels cell modulator (using a 45° Y-cut ADP crystal) that phase modulates the signal laser beam in synchronism with the modulation waveform. The signal beam laser and reference beam laser are tuned, servo-locked, and stabilized to a difference frequency of 300 MHz. The beams are collimated, combined, and transmitted through the atmosphere to the receiver. At the receiver, the beam through the telescope is focused on a photomultiplier detector and the difference frequency is generated. The 300 MHz difference signal is amplified, converted to a 60 MHz second IF, amplified, limited, and discriminated to recover the modulation waveform which is amplified and displayed on a cathode ray oscilloscope.

Note:

Inquiries concerning the design and characteristics of this system may be directed to:

Technology Utilization Officer
Goddard Space Flight Center
Greenbelt, Maryland 20771
Reference: B67-10587

(continued overleaf)

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: John N. Packard
of Aircraft Armaments, Inc.
under contract to
Goddard Space Flight Center
(XGS-10396)