some measuring as high as twenty-two lines per millimeter. Under identical conditions but without stabilization, pictures obtained during these tests averaged six lines per millimeter.

Reconnaissance devices, other than cameras, are still subject to many of the same environmental conditions which cause loss of quality in photographs. These devices will require stabilization if the effect of airplane motion is to be eliminated and their resolution maintained at a high level.

In high speed airplanes it is necessary to automatically accomplish as many functions as possible. This eliminates human error and frees the crew members to perform other operations. Automatic azimuth positioning of the stabilized camera would eliminate the last minute corrections which now have to be calculated and manually set in a very short period of time.

Design Problems on a Twin Camera Mount Using Brute Force Stabilization

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IN TRYING to achieve high resolution, or long exposure times, one cannot bolt a camera directly to an aircraft. Because an aircraft is not a stable platform, it is necessary to isolate the camera from the aircraft rotational motion. This is usually done by a gimbal mounting, either a three-axis gimbal mounting, or two, depending on whether or not the motion about one axis can be neglected. Mounting a camera on a gimbal introduces a number of other factors, namely, that it is very easily disturbed by small forces.

In designing a stabilized camera mount, the designer would like to eliminate these forces. Since this is not actually practical, he tries to minimize them.

The other approach is to oppose the disturbing forces with counteracting forces, and a combination of minimizing the disturbances and counteracting them is usually used. One of the disturbances entering into a mount is unbalance. If a camera is suspended in such a manner that its point of suspension is not coincident with the center of gravity, an unbalance exists which tends to upset the camera. Mounting the camera pendulously is not a complete solution and sometimes is not a solution at all because of the side forces introduced in aircraft flight. Other forces coming into play are those due to electrical cabling, i.e., the spring forces of the cables, internal torques generated within the cameras, and friction torques generated by the methods of mounting. Slaving a camera to a specific position, relative to dynamic vertical, is not as severe a problem as stabilization. Several servo techniques today are capable of handling this without too great a complexity.