STATINTL

MEMORANDUM FOR:

This draft rec'd from

 13 Sept 62

at NPIC by Dave

Comments?

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(DATE)

FORM NO. 101 REPLACES FORM 10-101
1 AUG 54 WHICH MAY BE USED.

(47)

DECLASS REVIEW by NIMA/DOD

STATINTL

The [REDACTED] proposes the performance of all or a desirable selection of the following calibration and auxiliary data adjustment services for a combination package of a twin frame star ground camera and a twin convergent panoramic camera of specified performance characteristics. It is assumed that both twin camera packages are operated in a space vehicle in a loosely coupled synchronous mode and that no rigid mechanical coupling and/or unambiguous correlation exists between their operation.

Under such conditions the exterior and interior orientation of the twin panoramic camera can be checked at each exposure through data obtained from the following calibration and adjustment services:

1. <u>Pre-flight star/ground camera calibration.</u> If necessary to obtain the exact interior and relative orientation of the twin ground/star camera package including the optical distortion of both lenses. It is suggested that these data, if not already available, be produced from a pre-flight ground based calibration procedure as described in Appendix A. The process has been very successfully used for the calibration of the "A" packages.

2. <u>Orbit Adjustment through space camera positions established by resection.</u> Camera stations in space can be established in areas where both usable 70mm ground camera frames and reliable 1:250,000 maps or identifiable ground control points are available. The orbit improvement procedure will require approximately 20 resections which will be distributed appropriately over the operationally significant length of the orbit. The space stations resulting from these resections will be combined with the preliminary orbital data which are based on real-time observations and are furnished by the customer. The computed space stations will establish

an unambiguous ephemeris for all exposure stations with direct relation to the ground, eliminating possible time correlation errors. The technical procedures to be used are described in Appendix B. They have been performed within the present "A" program.

3. <u>Determination of exterior orientation of each panoramic frame.</u>
By correlating the panoramic imagery around the principal point (image coordinates $x=0$; $y=fd = 0$ where f=focal length and d = sweep angle) with the corresponding terrain imagery shown on the 70mm x 70mm frames, the pitch, roll and yaw of the principal camera axis will be determined with respect to a defined coordinate system. In addition to the exterior orientation, the resultant data will show timing discrepancies between the shutter of the ground frame camera and the zero passage of the panoramic camera. It will also show the exact relative orientation of the two panoramic cameras as well as possible changes in it during the mission. The procedures to be used for the determination of pitch, roll and yaw are currently being used, although for a different purpose, in the evaluation of "A" photography.