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~~(S)~~ NATIONAL RECONNAISSANCE OFFICE
WASHINGTON, D.C.

THE NRO STAFF

27 April 1970

MEMORANDUM FOR RECORD

SUBJECT: Report of TDY, 23-24 April 1970, EKC

On the 23rd and 24th of April I visited Rochester, New York, to attend two meetings at EK facilities. The meeting on the 23rd was held at the request of NPIC to discuss mensuration questions relative to the GAMBIT. The meeting on the 24th was called at the request of [redacted] to get more information concerning the change from 3404 and SO-380 to SO-349 and SO-236. Although these were the reasons prompting my trip, as is usual in such cases, the more important developments and discoveries were rather serendipitous.

The most important revelation to come from the 23 April meeting at the Lincoln Plant with NPIC was the disclosure that recent tests which are still in progress on the film transport mechanism in GAMBIT have disclosed three peaks in film vibration at 10, 230, and 400 hertz. A plot of power spectral density vs frequency shows that the peaks for these three vibration modes lie in a straight line. The 10 CPS vibration at the lower end is caused by the roller arm damper mechanisms and is easily seen as a start-up transient. The higher frequency peaks are apparently caused by a lack of stiffness in the connection between the platen and the inertia wheel. A fix is planned to stiffen this assembly and move the vibration to a higher and therefore less objectionable frequency. Although the 230 hertz vibration has been known, the 400 CPS oscillation had not been previously suspected since it is too close to the 500 cycle timing frequency. The film speed specification calls for less than 0.6mm per second, velocity error allowable. The expectation is that film speed will be in specification very soon. Mission 4322 was about four times worse than spec.

Although the high frequency component will probably be under control relatively soon with a fix of the torsional oscillation of the platen fly wheel, ~~at~~ 10 cycles per second, start up oscillation is causing a considerable degradation in resolution and will continue to cause a degradation in resolution in the foreseeable future. This is because the start-up

~~GAMBIT HEXAGON~~

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transient is expected to occur at the first $3\frac{1}{2}$ inches of frame and we are routinely shooting 4 inch frames now. The decision to fly GAMBIT to maximize target collection will result in resolution distributions sharply worse than previously seen for all but the winter months. For instance, instead of slit 3 or 4 being the modal slit for 4326, it is slit 5. An examination of the return of the first bucket shows that the mission is satisfactory in terms of target content but hardly good in terms of quality of coverage.

SO-349, which Kodak has announced will be the replacement for 3404, has just been given the official name or designation of 3414 according to Mr. Schoessler. In a meeting at the Hawkeye Plant he also announced that the replacement for SO-380 which was announced as SO-236 has now been designated as 1414, signifying that both films are going to be standard rather than special order in the Kodak inventory. Besides the information we already have on the relative resolution sensitivity, etc., of the replacement films, it is interesting and significant to note that the backing has smaller pelloids. It turns out that one of the reasons Kodak is replacing the SO-380 is it is extremely difficult to manufacture which resulted in: (1) most of the film being manufactured being thrown out as not ~~being~~ meet spec and (2) local ~~and~~ environmental pollution in the Rochester area.

The most significant point is the comment made by Majors [redacted] and reinforced by analysis of the 4326-1 return. Namely, GAMBIT is being flown against the published requirements which say nothing about resolution maximization, but instead stress numbers of targets attempted. Therefore, Dr. McLucas and his wish to assay a 65 NM operational perigee notwithstanding, we can expect the resolution results of GAMBIT to be generally worse than on previous missions even with increasing optical and film quality. It is doubtful, for instance, that we will see [redacted] again until 4332. This situation is rather ironic in that everyone expects with the advent of HEXAGON, GAMBIT will have to make 180^{o} turn in its operational philosophy and developmental goals. Of course, with the High and Higherboy consideration, we are presented with the interesting picture of the NRO circus rider galloping down the path while standing one foot astride each of a pair of firey white stallions, one labeled "high resolution system" and the other "HEXAGON back-up." It looks like there is a fork in the road where the paths ~~spreads and~~ narrows to one horse.

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