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~~151~~ NATIONAL RECONNAISSANCE OFFICE

WASHINGTON, D.C.



OFFICE OF THE DIRECTOR

MEMORANDUM FOR MR. PACKARD

SUBJECT: Senator Ellender's Questioning on EOI and FROG

On Tuesday, June 15, I briefed the Senate Appropriations Committee on the FY 1972 NRP budget. Senators Ellender and Young and Executive Assistant Woodruff attended. [redacted] and Col Dave Bradburn backed me up at the session. Chairman Ellender zeroed in on one main point: He considers that our current plan to begin FROG and EOI this year represents unacceptable duplication. He said he intends to question you on that subject and on other possible cases of duplication tomorrow. (Mr. Woodruff said that AX vs Cheyenne would be one of the other cases you would be asked about.) This memo is to assist you in the discussions with Senator Ellender's Committee on FROG and EOI.

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Properties of the EOI System

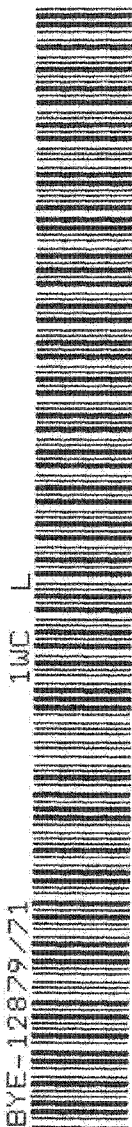
a. Favorable. EOI has some properties which are not achievable by any of today's photographic collection systems:

(1) High signal-to-noise ratio. This means better image quality within its resolution capability of around two feet.

(2) A promising capability for low light (twilight or night) photography. This could open up far northern regions which are usually in poor light and also give more frequent access to targets we can now see only in the daytime.

(3) Virtually instantaneous return of imagery to the [redacted]

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GAMBIT

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(1) Depends upon new technology. The system elements which involve some technical risk are the solid state detector, the very large optics, [REDACTED] the radio communication links and the image reconstruction equipment.

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(2) Schedule and cost risks. All of the technical problems appear solvable; nevertheless they introduce a considerable degree of uncertainty as to when the system will be available and how much it will cost.

Properties of FROGa. Favorable.

(1) Low development risks. The main system elements are made up of the GAMBIT space vehicle and camera. The new components, consisting of film processor scanner, radar electronics, and ground reconstruction equipment, have all been proven in space or in laboratory life tests.

(2) Potential for GAMBIT-quality photography. While FROG will normally produce imagery of about the same resolution as EOI, FROG could, on demand, be brought down to a low operating altitude and produce one foot GAMBIT-quality imagery for brief periods in a crisis situation.

(3) Low development costs. This follows from the limited amount of development actually necessary.

(4) Lower net operating costs. FROG can replace some GAMBIT flights as a result of its capability for high resolution photography on demand.

b. Unfavorable.

(1) Requires one to two hours for return of imagery because of time needed for on-board development of film.

(2) Has no growth potential for low light levels.

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Rationale for current plan. EOI is the preferred technical approach for the long term. We are in agreement on this point and our plan provides for the best orderly progress for an EOI system. Our best estimate is 1976. We have also been asked, however, to provide an interim crisis response capability appreciably sooner than our best estimate of EOI availability. FROG does appear to be entirely practical and can provide the necessary interim capability we have been asked for. FROG can be operating 30 months from go ahead or about two to two and one-half years before EOI.

I believe Senator Ellender will ask you to select one or the other of these near-real-time systems. In that case we will be deciding between an early capability, FROG, or a better eventual capability, EOI. Either course would be at variance with what USIB has at one time or another asked us to do but either course would be cheaper than our present plan.

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WASHINGTON, D.C.



OFFICE OF THE DIRECTOR

June 15, 1971

MEMORANDUM FOR THE RECORD

SUBJECT: Meeting with Senator Ellender and Senator Young
on the NRO Program

Today we had a very good session with Senator Ellender. Unfortunately, Senator Stennis, McClellan and Smith were unable to attend. I understand Senator Smith is not feeling well this week and the others got tied up on other business.

Senator Ellender interrupted our presentation many times with rather knowledgeable questions. Of course he made the usual remarks about how we are over-collecting and how we continuously overstate the Russian threat, etc. I did not challenge him with respect to the Soviet capability, but tried to stick to the subject of collection.

We told him that we were requesting this year and proceeded to describe the systems which we are now operating and the two new systems which we propose to develop: namely, the FROG and the EOI. He listened to our story about the current systems with considerable interest, interrupting with a number of questions, but not in a critical tone. With respect to the two new systems, he was quite critical. He wanted to know why we wanted such a capability, but more especially why we had to have two systems to achieve the desired capability. We referred frequently during our presentations to the bodies of government for which we work, specifically to the USIB, which sets our requirements. He went into considerable detail as to how these requirements affect us. For example, do they tell us how many missions to fly, etc. We answered no, we were not told how many missions to fly, nor were we told the configuration of the missions, but we were told the general requirements that coverage of certain types is needed with a certain frequency. From this we derived the required flight schedules. In general, certain types of photo

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coverage are required every quarter, and so we have to fly something every quarter. Then on top of that we have to fly enough total missions to satisfy the stated requirements which call for covering the builtup areas every six months and the non-builtup areas every year. The total coverage requirement demands more than one mission per quarter.

Then he wanted to know why we felt we had to have the two systems for near-real-time readout. We told him that there were different reasons why we needed each of the two. In the case of the FROG we said that the reason we needed to go ahead with that development was that various members of the Executive Department had stated an immediate requirement to get a system which could be on orbit as early as possible and that in looking at the system which could be brought in first, this was it. It is based on GAMBIT, which is a current system; it provides coverage of the desired quality and it appears to be able to do this for periods of about a year. It would tend to replace GAMBIT mission so that the costs are not purely additive. It is based on first the GAMBIT and second, additional technology which has been demonstrated in other programs, so that it is a low-risk program. It is considerably cheaper than the other candidate program. That is the justification for the FROG.

As for the justification for the EOI system, first it produces pictures of a higher quality than the FROG output. It can take pictures of slightly better resolution and much better signal-to-noise ratio. It also has the potential for operation in the infrared. The fact that it has a better signal-to-noise ratio would allow it to operate under poorer lighting conditions than are necessary for the GAMBIT. This means that we could operate farther into northern latitudes during winter months with such a system than we can with GAMBIT. Eventually, through the further development of detectors, we could achieve an infrared capability which would allow operation under nighttime conditions. The current detectors that are used in our forward-looking infrared systems on airplanes have achieved resolutions of the order of one-quarter mil. Such a system is just barely adequate for a satellite (producing pictures of about 100-foot resolution), but through the normal improvements

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which could be expected we would be able to take pictures of roughly 10-foot quality at night with the EOI system. Such a capability should be available toward the end of the 70s. So this is a not insignificant upgrading of our current capability.

Senator Ellender listened to all this. He believes that we ought to pick one of these two systems and forget about the other one. He says that if we feel strongly that the EOI is ultimately the system that we want then it is not too much of a delay to forget the FROG and wait for the EOI. On the other hand, if the FROG is good enough, we ought to go ahead with it and forget about the other one. He feels strongly enough about this that he wants to take it up with Mr. Packard tomorrow. I told him that we of course did not state requirements, that various members of the Executive Branch, including Secretary Rogers and Dick Helms, feel strongly that such a capability is needed. We told him that if the near-real-time requirement had not materialized that we could operate our programs for [redacted] in FY 72. But it did materialize; it grew out of last summer's activity where we were asked to get the coverage of the Mid-east buildup of SAM sites and that during the course of that buildup we tracked it as well as we could by U-2s, but there was a continual questioning on the part of the various governmental officials as to why we weren't up all the time and why we weren't providing continuous coverage, etc.

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He wanted to know whether it was that single event which led to the requirement for the near-real-time systems. I said no, that we had gone back and reviewed the situation. A total of seven scenarios had been examined and the two near-real-time systems that we had come up with were capable of satisfying the needs generated in those seven scenarios--situations like Mid-east, Czechoslovakia, etc. He expressed the view that we don't need to know that much about those situations, that we are not going to do anything about them and that we ought to forego this kind of information. I did not respond. In any case we will take steps to prepare Mr. Packard for his

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meeting tomorrow by pointing up the questions and what we think are the principal features favoring the FROG and the EO1 systems.

John L. McLucas

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