

HEXAGON TERMINATION

The United States now has operational satellite systems which operate together to provide

- search of broad areas, and
- high resolution spotting or surveillance coverage of important targets

The present CORONA is essentially meeting the search requirements and the GAMBIT-3 (G-3) is meeting 98% of the general surveillance requirements and will have greater capacity in the future. CORONA's search capability has been adequate to detect and monitor major modifications of strategic installations. For example, nearly all the new SS-9 and SS-11 ICBM silos have been discovered by CORONA; it can identify bombers and count other types of aircraft; and, it can detect new surface-to-air missile sites.

The HEXAGON system was initiated in 1964-65. Since 1964-65 both the CORONA and the G-3 surveillance system have improved significantly in resolution and in mission life time. Further improvements in the G-3 system will be introduced this year. HEXAGON is presently planned as a replacement for the CORONA and a partial substitute for the surveillance system.

EYE-11668/69

8D



EYE-11668/69

HANDLE VIA BYEMAN  
CONTROL SYSTEM  
HEXAGON GAMBIT

Cy 8/17/80 8D

HEXAGON

CORONA GAMBIT

~~TOP SECRET~~

~~TOP SECRET~~

2

The issue is which combination of search and spotting photographic satellite systems yields the best intelligence coverage for the lowest cost. In the attachment and below we have compared two combinations--one with CORONA and one with HEXAGON.

Common to both mixes is the G-3 spotting or surveillance system. The G-3 best resolution to date has been 12"

This is much better than the HEXAGON. The G-3 spotting system provides high confidence performance against a surveillance requirement which is by definition a sampling requirement. This coverage is carefully calculated in the case of each target category to detect within six months a change or breakthrough in Soviet weapons technology, force structure, or force levels. (Present quarterly sampling of target categories varies from 10% to 40% of the total targets in a category, with 40% typical of R&D test areas.) If present sampling rates are considered too low, a higher rate could be achieved by using the planned longer life G-3 vehicles or by flying some (perhaps 2-3 per year) G-3 missions at a higher altitude with resolution still superior to HEXAGON.

The present CORONA/G-3 mix offers:

- a higher number of missions (11 compared to 8)  
with a smaller time gap between missions,

BYE 11/18/19  
HANDLE VIA BYEMAN  
CONTROL SYSTEM  
HEXAGON GAMBIT

~~TOP SECRET~~

C4 8d

- greater reliability,
- more high quality G-3 photography, and
- lower costs (savings of \$100 million annually and \$600 million over five years). These cost savings assume that reliability factors, necessary assurance of coverage, and the desire to avoid gaps will require 4 successful HEXAGON launches per year and 5 programmed launches per year, particularly in an arms limitation environment.

The HEXAGON/G-3 mix provides:

- a 280-mile wide swath or path of coverage on the ground as against the 130-mile swath of the CORONA. However, the 280-mile optional mode would expend the HEXAGON film supply at such a rapid rate that the full swath will be used only occasionally.
- a better resolution than the CORONA (2' to 2.5' as opposed to 6.0' best for present CORONA and a potential 4.5' for future CORONA).

But HEXAGON is a technically complex system whose first launch is at least 20 months away. It remains subject to cost escalation, program slippage, and initial reliability problems affecting such systems. Termination of the CORONA now in progress places reliance for search on a still untested system with the implicit risk of serious gaps in search coverage.

BYE 7/16/69  
HANDLE VIA BYEMAN  
CONTROL SYSTEM  
HEXAGON GAMBIT

~~TOP SECRET~~

c980

It may be argued that superior characteristics of the HEXAGON search resolution would provide higher confidence and earlier detection of mobile ICBM's, possibly camouflaged, and other evasions of arms limitation treaties.

Mobile ICBM's must be more than 65 feet long (MINUTEMAN length). It should be noted that current intelligence estimates on mobile ICBM's indicate that it is highly unlikely that the Soviets will deploy this type of system because of problems of degraded accuracy, reliability, high maintenance costs, and command and control difficulties. However, even if the Soviets did in fact deploy, the current capability is probably adequate for detection if not for order of battle. G-3 was adequate to detect the deployment along the Sino-Soviet border of tactical missile systems (Scaleboard-SS-12 and other tactical missiles). These systems are smaller than a mobile ICBM which would be a threat to the U.S.

Moreover, the mobile ICBM's are likely to be detected with the high resolution G-3 in the typical 2 year R&D test phase as well as in deployment. Should the high resolution satellite fail to detect these missiles in the R&D test phase, the CORONA/G-3 mix would identify the deployment through the missile signature and/or the associated required maintenance and support facilities.

~~TOP SECRET~~

BYE 11668/69  
HANDLE VIA BYEMAN  
CONTROL SYSTEM  
HEXAGON GAMBIT

c480

As to arms limitation evasion, ICBM's and other strategic weapons of major threat to the U.S. would be discernible to the present mix of satellite systems in both test and deployment. Sophisticated improvements in strategic weapons, if visible at all through photographic means, would require far better resolution than the HEXAGON could provide.

BYE 11/6/69

HANDLE VIA BYEMAN  
CONTROL SYSTEM  
HEXAGON GAMBIT

~~TOP SECRET~~

c48d

System Mix Options Where Both Meet Current Requirements

CORONA/G-3 Combination

<u>System</u>	<u>Programmed Launches</u>	<u>Successful Missions</u>	<u>Unit Cost</u>	<u>Annual Costs</u>
CORONA	7	6	\$15 M	\$105 M
G-3	6	5	\$23 M	\$138 M
Total Annual Costs				\$243 M

Comments

- a. Nearly all surveillance with best available resolution.
- b. Poorer (6'-10') resolution for search capability, but adequate to cover Sino-Soviet bloc.
- c. Shorter gaps between search and surveillance missions.
- d. More G-3 missions for technical intelligence.
- e. Less risk.
- f. Lower 5-year costs (operating +\$535 million; investment +\$100 million)

HEXAGON/G-3 Combination

HEXAGON	5*	4	\$45 M	\$225 M
G-3	5	4	\$25 M	\$125 M
Total Annual Costs				\$350 M

\*Assumes that 5 launches per year will be programmed to achieve 4 successful missions especially in the early years. The presently approved program is 4 launches per year which may achieve only 3 successful missions.

Comments

- a. Better wide-area search resolution.
- b. Less surveillance target looks with best available resolution.
- c. Longer gaps between search and surveillance missions.
- d. More risk.
- e. Higher 5-year costs (see comment above: \$635 million more than mix Option 1).

COMPARATIVE CAPABILITIES OF CORONA, HEXAGON and G-3

	<u>Cost/ Launch</u>	<u>Resolution Best Nadir</u>	<u>Swath</u>	<u>Area Coverage/ Mission</u>	<u>Orbital Life</u>
CORONA	\$15 M	5'-6'	128 nm	9-11 million sq nm	18-20 days
HEXAGON	\$40-45 M	2.5'	280 nm	20 million sq nm	30-45 days
G-3	\$23 M		5-12 nm	180-200 targets covered per day	14-18 days

BYE 11668/69  
HANDLE VIA BYEMAN  
CONTROL SYSTEM  
HEXAGON GAMBIT  
COPY 80