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CORONA/GAMBIT/LANYARD
HANDLE VIA BYEMAN-TALENT/KEYHOLE-
COMINT CONTROL SYSTEMS JOINTLY

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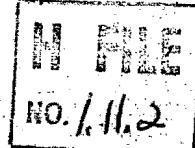
USIB-D-41.13/11

(COMOR-D-13/16)

27 July 1964

Limited Distribution

Approved by USIB-D-41.13/12
attached



UNITED STATES INTELLIGENCE BOARD

MEMORANDUM FOR THE UNITED STATES INTELLIGENCE BOARD

SUBJECT : Long-Range Requirements for Satellite
Photographic Collection

REFERENCE : USIB-D-41.13/10 (COMOR-D-13/14)
24 July 1964, Limited Distribution

1. The enclosed report on the subject from the Committee on Overhead Reconnaissance (COMOR), in response to USIB action in Executive Session at its 22 July meeting as recorded in the reference, is transmitted herewith for consideration by the Board of the COMOR Conclusions and Recommendations contained in Tab B hereto, pages 6 through 10.
2. The National Photographic Interpretation Center (NPIC) study attached as Tab c hereto is being distributed in a limited number of copies primarily to USIB Members and Observers.
3. The enclosed COMOR report is scheduled for consideration by the USIB at its meeting on 29 July 1964.

James S. Lay, Jr.
JAMES S. LAY, JR.
Executive Secretary

Attachment with

Tab A

Tab B

Tab C (TCS-7473-64)

HANDLE VIA BYEMAN-TALENT/KEYHOLE
COMINT CONTROL SYSTEMS JOINTLY

LANYARD
CORONA/GAMBIT
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GROUP 1
Excluded from automatic
downgrading and
declassification

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Handle via BYEMAN,
TALENT-KEYHOLE
Controls

CORONA/GAMBIT/LANYARD

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UNITED STATES INTELLIGENCE BOARD

MEMORANDUM FOR THE UNITED STATES INTELLIGENCE BOARD

SUBJECT: Long-Range Requirements for Satellite
Photographic Collection

REFERENCE: USIB-D-41.13/10 (COMOR-D-13/14)

1. This report is in response to the assignment by the Board at its Executive Session, meeting of 22 July, and seeks to respond directly to the Chairman's directive to COMOR set forth as an attachment to the referenced document. For the convenience of the Board in studying this report, that attachment is set forth as Tab A.
2. In pursuing its assignment, COMOR took into account its knowledge of the nature and mode of operation of the present KH-4 and KH-7 systems and the results obtained therefrom, comments of the NRO on the prospects of improvements to these systems, a briefing by CIA on a proposal for a search system with area coverage approximating KH-4 and resolution approximating KH-7, and a briefing by the NRO on

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CORONA/GAMBIT/LANYARD

Attachment
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G-3 and LANYARD. It had available, of course, the papers on the same subject submitted to the Board in April 1963 but on which there had not been a conclusion by the Board. NRO and the NPIC representatives participated fully in the discussions.

3. In direct response to the Board's assignment, the COMOR specified to NPIC the essential elements of information on major problems with a request that the NPIC, using the resources of all of the agencies participating in NPIC, advise on the extent to which the EEI could be met by photography with a capability of resolution to permit interpretation objects ten feet, three feet, [redacted] The results of this study are submitted at Tab C.

4. The conclusions which COMOR has reached as a result of its examination of the problems presented in our assignment are expressed in Tab B.

James Q. Reber
James Q. Reber,
Chairman
Committee on Overhead Reconnaissance

Attachments (3)

Tab A
Tab B
Tab C

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Tab A

Directive to COMOR Regarding Long-Term Intelligence

Requirements for Satellite Photographic Reconnaissance

1. COMOR is directed to provide for the Board's consideration at its 29 July meeting recommendations for future intelligence requirements for satellite photographic reconnaissance from the standpoint of required input to the intelligence inventory. In preparing its report, COMOR should take into account the experience achieved thus far through the use of the KH-7 and KH-4 configurations and an analysis by NPIC on the extent to which specified Essential Elements of Information can be met by improved resolution and quality of photography.
2. The COMOR deliberations and report should be concerned with the needs from an intelligence viewpoint of improved resolution in the GAMBIT spotting system, the advantages and disadvantages of a very much higher resolution in the spotting system even though the area coverage is reduced, the ability of the present and contemplated spotting systems to cover targets of interest with due consideration to accuracy of pointing and the ability to cover successive targets because of time involved in the roll and pointing of the camera.
3. Recommendations will be expected on the advantages of improvements to the present GAMBIT system considered feasible with further research and development and also advantages to be gained from further improvement in the existing CORONA system.
4. The importance of the development of a search system with area coverage approximating the CORONA (KH-4) but with resolution equaling the GAMBIT (KH-7) should be examined from the standpoint of the value of the input of Essential Elements of Information to the intelligence inventory resulting from such a development.

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Tab A Contd

5. Finally, consideration should be given to the need for an interim search system built around the LANYARD cameras which might produce resolution considerably better than the KH-4 but not as good as the KH-7 and which could be available long in advance of any of the proposed systems.

6. Although there is no indication that budget restrictions or technical or physical resources would necessarily foreclose concurrent action in several of the areas mentioned above, USIB would be interested in COMOR's views on the relative importance and hence the priorities which might be attached to the several courses of action indicated.

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Tab B

CONCLUSIONS

1. Intelligence requirements for search and surveillance necessitate a satellite photographic capability or capabilities for complete area coverage of the Sino-Soviet Bloc with a resolution which will permit interpretation of objects between three and four feet on a side.
2. There is also a requirement for photography which will permit interpretation of details on the order of [redacted] on a side on a number of targets.
3. There are many advantages and we believe no disadvantages from the point of view of photo interpretation or analytic usefulness in a satellite photographic system which would have continuous stereoscopic ground coverage equivalent to KH-4 and resolution equivalent to KH-7.

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Tab B Contd

4. There would also be advantages in a system with the capability to permit interpretation of details [redacted] on a side even with a swath width approximately half that of KH-7. Such resolution would provide valuable increments to our intelligence inventory. Although the number of targets for which such a system would be required in terms of vital importance is relatively small, the ability of such a system to also provide additional information on less critical targets could be an over-all important bonus.

5. Improvements are perhaps possible in KH-4 and KH-7 resolution--at best a reduction in the KH-4 from ten to nine feet and in the KH-7 from three to two feet. Improvement should be made in these systems, as well as in their reliability, without impeding development of the systems discussed in paragraph 7.

6. Because of its relatively narrow swath width (about 50 miles) and non-contiguous stereo coverage, the LANYARD System

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Tab B Contd

(KH-6), of which there are five packages available, could not be usefully employed as a substitute for KH-4; nor, since it has an estimated five-foot on a side resolution, could it be employed as a substitute for KH-7.

COMOR has concluded that the KH-7 should be used in lieu of the KH-4 as a crisis satellite. However, before submitting its recommendation to the Board, COMOR has requested comments from the NRO and the NIC. In view of the fact that we are advised that the five LANYARD packages can be reinstated and placed on standby as a crisis satellite without interference with the developments recommended in paragraph 7 below, we recommend the consideration of LANYARD for this purpose.

In that case, there might eventually be on standby for a crisis both a KH-7 and a LANYARD, which in certain circumstances would be extremely desirable.

7. Recommendations on New Systems:

- a. That developmental work should proceed urgently toward the achievement of

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(1) A single capability for search
and surveillance with a continuous stereo-
scopic ground coverage equivalent to KH-4
and a resolution equivalent to KH-7; and

(2) A capability which will permit
interpretation of details on the order [redacted]
[redacted] on a side even with a swath
width approximately half that of KH-7.

b. That, if a priority of development must be
established, the second should have first priority. (COMOR
believes that in view of the existence today of a search and
surveillance capability in the form of KH-4 and KH-7, the
most urgent need is to develop a collection capability to
fill the coverage gap in the high-resolution area,
[redacted]

*The CIA recommends that the first capability should have priority over
the second. For the following reasons: a., A high-resolution system

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Tab B Contd

(three feet at nadir) which gives continuous, stereoptic coverage of a strip some 300 miles wide would appear to have substantially greater advantages from an over-all intelligence point of view over a very high resolution system [redacted] which CIA believes is

seriously limited by the very narrow swath width and by the difficulty of achieving the necessary, extremely high pointing accuracy; and

b., Based on CIA's analysis of several major weapons systems and nuclear materials installations, photographs with a ground resolution of about three feet are adequate to determine existence and identity, and to provide in most cases the data upon which capacity/capability can be estimated.

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Tab C

Ground Resolution Comparison by NPIC
(see attached)

1. The Board requested that COMOR's study take into account an analysis by NPIC on the extent to which the specified Essential Elements of Information (EEI) can be met by improved resolution and quality of photography. COMOR accordingly arranged for a CIA study on this question to be subjected to amplification of the EEIs by DIA and evaluation of target data at three different ground resolutions by joint teams of DIA and CIA photo interpreters. Within the limits of the time permitted, such amplification of the EEI was made and the above task force at NPIC sought to complete its evaluation. Pages 1 through 9 have been fully coordinated insofar as these evaluations are concerned. Pages 10 through 17 have not for lack of time been fully coordinated.

2. The Director, NPIC has given as his opinion that differences between the CIA study and the joint evaluation are probably not significant. He observes that for the most part, they are differences in precise interpretation or small variances in probability. This judgment was presumably based on pages 1 through 9.

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Tab C [Contd]

3. It was the consensus of COMOR that the column headed "Alternative, Possibly Better, Sources," should be omitted at this time. It was agreed that this column as presented is incomplete, particularly as to SIGINT contributions, and would nevertheless be thoroughly meaningful only if it contained alternative sources which could be weighed against a "yes" or "partially" in the [redacted] column. It would also only be important should the answers in the ten-foot column and three-foot column have been "no" or "partially." It would be necessary to specify that such obvious alternatives as obtaining the article in question, obtaining an operations manual, or suborning a technical expert involved in the design of the article must be ruled out. Furthermore, to permit a proper weighting of the need for such detailed photography, the entry in the "Alternative Source" column should be specific as to the type and value of the various elements of information which could be obtained on the one hand by high-resolution photography and on the other by the alternative source.

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Legend

- Yes - Task can be accomplished
Partially - Task partially accomplished
? - Some possibility task can be accomplished
No - Task impossible
* - Elements of information added by DIAPP-1

General Indication of Intelligence Information Obtainable Relative to Ground Resolution of Camera Systems

<u>Information Sought</u>	<u>10'</u>	<u>3'</u>	<u>Alternative, possibly better sources</u>	<u>Remarks</u>
A. ICEM-IREM/IREM System				
Identify launch complex	yes			
* Area search	yes			
* Identify launch & support facility	yes			
Basing				
Hard or soft launch	yes			
If soft - how missile prepared and erected for launch	?	?		If gross features are to be considered dependant upon amount of detail requested
If hard - determination of hardness based on:				
- Thickness of silo door			partially	
- Thickness of walls			partially	
- Extent "rattle space"			partially	

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Information Sought

10' 3'

Alternative, possibly
better sources

Remarks

- Suspension system

Depends on timing
and angle of photo-
graphy

Type launch (fly out or
lift out)

partially

*Periodic phases of site
construction

partially yes

General stages of
construction (early,
mid, late) iden-
tifiable on 10'

* Identification of ambiguous
support facilities (i.e.,
missile/space)

partially partially ? ?

Complete answer
requires other
information

Identification of weapons
system employed

partially partially

* Refire capability- Quantity
of support facilities and
additional missile storage
on or near launch sites

? ?

Location of nuclear warhead
storage

partially yes yes

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COMINT CONTROL SYSTEMS JOINTLY

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Alternative possibly
better sources

Remarks

Information Sought

10'

3'

Technical Characteristics of Missile

Liquid or solid fuel partially partially partially

If liquid, types of propellant no ?

Number of engines ?

Guidance, whether all-inertial
or radio-inertial partially partially partially

If radio-inertial, how functions no ?

Dimensions of missile:

- Length partially yes

Diameter at base partially

Number of stages partially

If defined on
missile

- Sizing of nose cone (RV) ?

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Information Sought

10'

3'

Alternative, possibly
Better sources

Remarks

B. ABM/SAM Systems

Locate/identify ABM facility/
complex *and security measures

yes

Ground photography

If signature is
known
Security measures
provide problems
at 10'

Support areas & facilities & equip-
ment ABM & SAM

partially

yes

Equipt. may not be
seen at 10'

Electronics

- Frequency of radar

no

no

?

- Dimensions of associated
radars and other sensors

?

partially

yes

Depends on size of
radar associated
with system

- Dimensions of wave guide

no

no

?

- Interrelationships between
element facilities of ABM
complex *testing areas
and oprnl.sites

partially

yes

yes

Externally supplied
power to site only

- Power input to major radars

partially

partially

partially

Mode of launch par-
tially on 10'

Weapons

- Launcher mechanism/mode of
launch

no

partially

yes

Dependent upon

Characteristics ABM/SAM

?

partia

yes

Dependent upon

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Information Sought

10'

3'

Alternative, possibly
better sources

Remarks

Characteristics AMM (continued)

Fuel

Type guidance

? ? ?

no partially partially

* Missile Ranges (Facilities)

yes yes yes

* Layout and Transportation

yes yes yes

* Support Buildings

yes yes yes

* Pad Configuration

yes yes yes

* Missile Configuration

no partially yes

This will not per-
mit detailed S&T
analysis

Launch Systems

Type Guidance

* Electronics Instrumentation Layout

* Electronic Instrumentation Components

partially yes yes

no no ?

yes yes yes

no partially ?

Uncertain meaning

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MINI CONTROL SYSTEMS JOINTLY

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708-7173-64

Information Sought

10'

3'

Alternative, possibly
better sources

Remarks

Submarines

- Sub base location yes
- * Sub base function ?
- Sub deployment dispersed ?

- Sub type identification ?

yes
yes
yes
partially
yes

COMINT

- Length ?

- Width ?

- Dimension of sail no

- * Missile Dimensions (Hatch) no

yes
yes
yes
partially
yes

Low altitude aerial
photography

- * Hull Construction no

- * Communications Facilities no

yes
no
yes

Ground photography

Only under optimum
conditions at [redacted]

* Naval Missile Support Facilities

- * Location yes

- * Function (i.e., ballistic
or cruise missile support) no

?
yes

Low altitude aerial
photography

Pass at 3' if mis-
sile or handling
equip. observed

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Information Sought

10¹

3¹



Alternative, possibly
better sources

Remarks

D. Nuclear Energy Production

- Identification of major production facility

yes	yes	yes
partially	yes	yes
partially	yes	yes
no	no	?
?	partially	yes
partially	partially	partially
partially	partially	yes
partially	partially	partially
?	?	?
partially	partially	partially
partially	partially	partially

- Overall power consumption

- Power consumption by section

- Chemical processing facilities

- Hot water effluence

- Metal and similar production

- Number of reactors

- Production rate of weapons

- Stockpile procedures

- Storage capacity

Nuclear Testing

- Test site identification

partially	partially	partially
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COMINT CONTROL SYSTEMS JOINTLY

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Information Sought	10 ¹	3 ¹	■ [redacted]	Alternative, possibly better sources	Remarks
.. Activity levels	yes	yes	yes		
- Weapon yields	partially	partially	partially		
D Test objectives	partially	partially	partially		

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COMINT CONTROL SYSTEMS JOINTLY

NAME VIA TALENT-KEYHOLE
COMINT COMBINED SYSTEMS JOINT

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Information Sought

10'

3'

Alternative, possibly
better sources

Remarks

E. Other Systems

1. Aircraft

Bases

- Location/presence of aircraft yes yes
- Fueling capacity yes

If large storage
tanks above ground

Identification of Aircraft

- By Class (Fighter Bomber) yes
- By type (Beagle Badger) ?
- By model no

yes
?
partially

Large aircraft

Characteristics of Aircraft

- Range based on size no

no ?

- Speed based on engine sizing and design no

no ?

Give optimum
conditions at

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COMPUTER CONTROL SYSTEMS JOINTLY

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Information Sought

10' 3'

Alternative

Remarks

* Weapon Storage

* Nuclear - Location

yes

Capacity

no

yes

yes

If observed during con-
struction

Hardness

no

yes

yes

* ASM - Location

yes

yes

Number and Type

no

yes

* AAM - Location

yes

yes

Capacity

no

yes

yes

If observed during con-
struction

Type

no

no

yes

* Conventional - Location

yes

yes

yes

Capacity

no

yes

yes

* Maintenance Support Facilities

Location

yes

Function & Capacity

partially yes

* Communication and Navigation Facilities

partially yes

Major Facilities only

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CONTINT CONTROL SYSTEMS JOINTLY

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Information Sought

10'

3'

Alternative, possibly
better sources

Remarks

F. Electronic and Communications

Radar and Commo locations

yes

Radar Design Determination

?

partially yes

Commo type identification

?

? ?

Mobility Status

yes

G. Missile Production

* Identification of Production Facility

partially partially yes

Can be ident., but product must be seen to ident as missile production

* Production Layout

partially yes

Depends on size and type of missile

* Product Identification

? ? yes

Large vert. stands visible at 10'

* Assoc. Test Facilities

partially partially yes

Blast marks visible at 10'

* Testing Activity

partially partially yes

*Research and Development Facilities

partially partially partially

* Testing Activity

partially partially yes

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T-20 PROD
FCI 6208A

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<u>Information Sought</u>	<u>10'</u>	<u>3'</u>	<u>Alternative</u>	<u>Remarks</u>
I. *Aircraft Production				
*Identification of Production Facility	Yes			
*Production Layout	Yes			
*Product Identification	Yes			If product is engines only 3' req.
*Testing Facilities (Static)	Yes			
*Flight Test Facilities (ident)	Yes			
*Test Vehicle	Yes			If product is engines only 3' req.
*Research & Development Facilities	?	?	?	Other collateral. Can look any other engineering bldg
*Test Cells (Engines)	Yes			
*Test Cells (environment)	?	?	?	Other collateral Poss assoc features could assist ident.
I. *CW Production				
*Production Facilities	No	No	No	Other collateral
*Storage	No	?	Partially	Other collateral
*Test Ranges	?	Partially	Partially	
J. *BW Production				
*Production	No	No	No	Other collateral Assoc features may allow "suspect" ident.
*Storage	No	No	No	
*Test Ranges	?	Partially	Partially	

HANDLE VIA TALENT-KEYHOLE-
WIRE CONTROL SYSTEMS JOINTLY

TCG-7473-64

Information Sought

	<u>10'</u>	<u>3'</u>		<u>Alternative</u>	<u>Remarks</u>
Ground Forces					
Locations of Installations	Yes				
*Mensuration of Bldgs	Yes				
*Location of Training Areas	Yes				
*Mensuration of Firing Ranges	Yes	Yes			
Type of Major Equipment	No	Yes			
O/B Identification of Unit by Type and Echelon	No	Yes	Yes		
*Level of Activity in Installations	Partially	Partially	Yes		
*Level of Activity in Training Areas	Partially	Partially	Yes		
Locations of Reserves & Support	No	Yes			
*Major Material Depots					
*Identification of Installation	No	?	Yes		
Facility Layout	Yes				
*Product Identification	No	Partially	Yes		

PACIFIC VIA PACIFICO-KEYROLIN
DATA CONTROL SYSTEMS JOINTLY

TCS-7473-64

TCS-7473-64

Information Sought

10' 3'

Alternative

Remarks

M. *Submarine and Other Naval Ship Production

*Identification of Prod. Facility

Yes

*Production Layout

Yes

*Production Identification

Yes

*Propulsion Equip. Prod.

?

?

?

*Product Identification

?

?

?

N. *Ground & Naval Armament Prod.

*Identification of Prod. Facility

?

?

Partially

*Production Layout

?

Yes

Yes

*Product Identification

No

?

?

*Research & Development Facilities

Yes

*Testing Activity

Partially Yes

HANDLE VIA TALENT-KEYHOLE
CONTROL SYSTEMS JOINTLY

AMERICAN
TALENT-KEYHOLE

TCS-7473-61

Information Sought

10' 3'

Alternative

Remarks

Inland Waterways

*Locks

Partially Yes

Gate dimensions

*Dams

Yes

*Craft

Partially Yes

*Wharves

Yes

*Storage (Open & Covered)

Partially Yes

*POL

Partially Yes

*Overpasses

Partially Yes

*Canals & Channels

Partially Partially Yes

*Mechanical Handling Facilities

No Yes

*Clearance (Rail & Road)

Yes

*Ship Repair Facilities

Partially Yes

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HANDLE VIA TALENT-KEYHOLE
CONTROL SYSTEMS JOINTLY

PACIFIC VIA RAILWAY-KENYON
COMINT CONTROL SYSTEMS JOINTLY

WCB 7173-64

Information Sought

P. *Ports

- *Wharves Yes
- *Warehouses Partially Yes
- *FOL Storage Facilities Partially Yes
- *Ship Repair Facilities Partially Yes
- *Mechanical Handling Facilities No Yes
- *Rail & Road Clearance from Wharves Partially Yes
- *Harbor Craft Partially Yes
- *Canalwaters and Jetties Yes

Q. *Railways

- *Bridges Partially Yes
- *Yards Partially Yes
- *Shops Partially Yes
- *Passing Track No Yes
- *Trackage Partially Yes
- *Motive Power No Yes
- *Freight Cars No Yes
- *Passenger Cars No Yes
- *Tunnels Partial Yes

10' 3' [Redacted]

Alternative

Remarks

ECG-7473-64

HANDLE VIA TALENT-KEYHOLE
COMINT CONTROL SYSTEMS JOINTLY

Information Sought

10¹ 3¹

Alternative

Remarks

R. *Highways

*Roadway Surface (Including shoulders) No ? Yes

*Drainage Facilities (Ditches, culverts,
etc.) No Partial Yes

*Bridges Partially Yes Yes

Structural dimensions
for capacity and
vulnerability

*Defiles Yes

*Ferrys Partially Yes

*Tunnels Partially Yes