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PROJECT
CORONA

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INDEX

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Operational Reports Control

Time	Report	Title	Reason for Report
Each Friday	[redacted]	Weekly Status	To keep Hqs informed on the long range status (estimated launch dates).
L-14 days	[redacted]	Ephemeris Data	To provide Hqs with ground track and other data necessary to establish camera on-off points.
L-10 days	[redacted]	Program Data	To furnish LMSD with data to cut programm tape (camera on-off points). Data may be furnished for more than one tape.
L-5 days	[redacted]	Daily Status	To keep Hqs informed on the immediate capability to launch. Report required every day from L-5 days until launch.
L-3 days	[redacted]	Mission Data	To inform LMSD of camera settings and filn type to be used. Also to select final camera on-off points to use.
L-30 hours	[redacted]	Mission Plan	To inform LMSD of Hqs decision to delay or continue the launch based on Weather in target area. To provide LMSD with optimum launch time and earliest and latest time of day launch could occur and give sufficient sunlight for photography.
L-8 hours	[redacted]	Recovery Wx	To provide Hqs with forecast of Wx in Recovery area
L-6 hours	[redacted]	Go-No-Go	To inform LMSD of final Hqs decision to launch or delay based on target weather.
L-2 hours	[redacted]	Special Status	To keep Hqs informed of status of vehicle during pre-launch countdown. Report submitted each hour until launch or abort.
L+10 min	[redacted]	Launch Report	To inform Hqs that launch has occurred.
L+2 hrs	[redacted]	Progress Report	To inform Hqs of success of launch and preliminary data.
L+20 hrs	[redacted]	Progress Report	To provide Hqs with actual ground track of satellite and estimated recovery time.
ASAP	[redacted]	Flash Recovery	To inform Hqs of the recovery of the capsule and brief description of condition.
ASAP	[redacted]	Take Report	To inform Hqs of ETA of take at West Coast and condition of take.
As Occurs	[redacted]	Abort Report	To inform Hqs of a delay requiring postponement of launch until next day or longer.
As Occurs	[redacted]	Crash Report	To inform Hqs of a mishap to a vehicle involving loss of life, injury or destruction of property.

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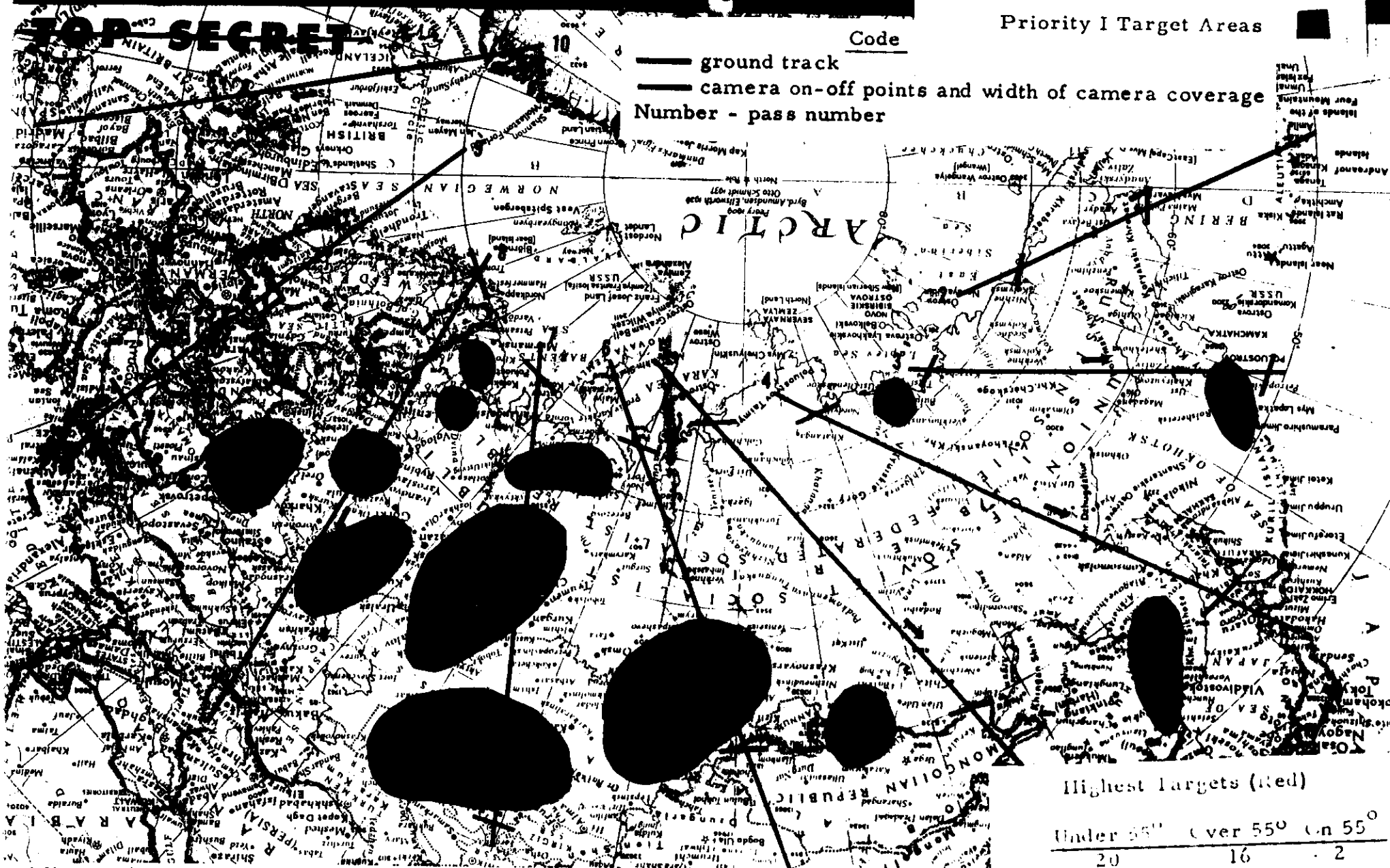


Mission 9002, Launch date	-	28 July 1959
Orbital Period	-	95.25 minutes
Apogee Altitude	-	120 statute miles
Perigee Altitude	-	540 statute miles
Average Altitude Target Area	-	160 statute miles
Total Flight Line Coverage	-	11,000 nm

Highest Targets (Red)

Under 55°	Over 55°	On 55°
20	16	2

High Targets

Under 55°	Over 55°
402	116

Chronological Sequence of Events - CORONA Test Vehicle #3
April 1959

Date/Time	Event
13/1800Z	Estimated time of launch of test vehicle #3.
1 April L-12 days	Receip. by Headquarters of Ephemeris Data (from this ground track of the vehicle is obtained), recommended camera settings and film type.
2 April L-11 days	Headquarters determined camera on and off points considering intelligence requirements, film supply, and climatology.
8/2100Z L-5 days	Headquarters received first of daily status reports on vehicle with latest estimated time of launch (ETL).
10/2000Z L-72 hours	Headquarters considered and approved recommended camera settings and film type.
12/1200Z L-30 hours	Headquarters considered weather in target area (best weather to date - 4000 nm flight lines in 3/8 or less cloud cover). Headquarters also determined earliest and latest time of day launch could occur and give sufficient sunlight for photography.
13/1200Z L-6 hours	Headquarters took final look at weather (2500 nm flight lines in 3/8 or less cloud cover).
13/1600Z L-2 hours	Receipt by Headquarters of first of hourly status reports giving latest ETL and reasons for delays.
13/1700-2100Z	Receipt by Headquarters of several launch delays caused primarily by weather at the launch site.
13/2200Z L+42 minutes	Receipt of launch report. Successful launch at 2118Z. Vehicle definitely in orbit.
13/2316Z L+2 hours	Receipt by Headquarters of first post launch status report. Vehicle in polar orbit. Orbital time approximately 3 minutes less than planned. Vehicle under control.

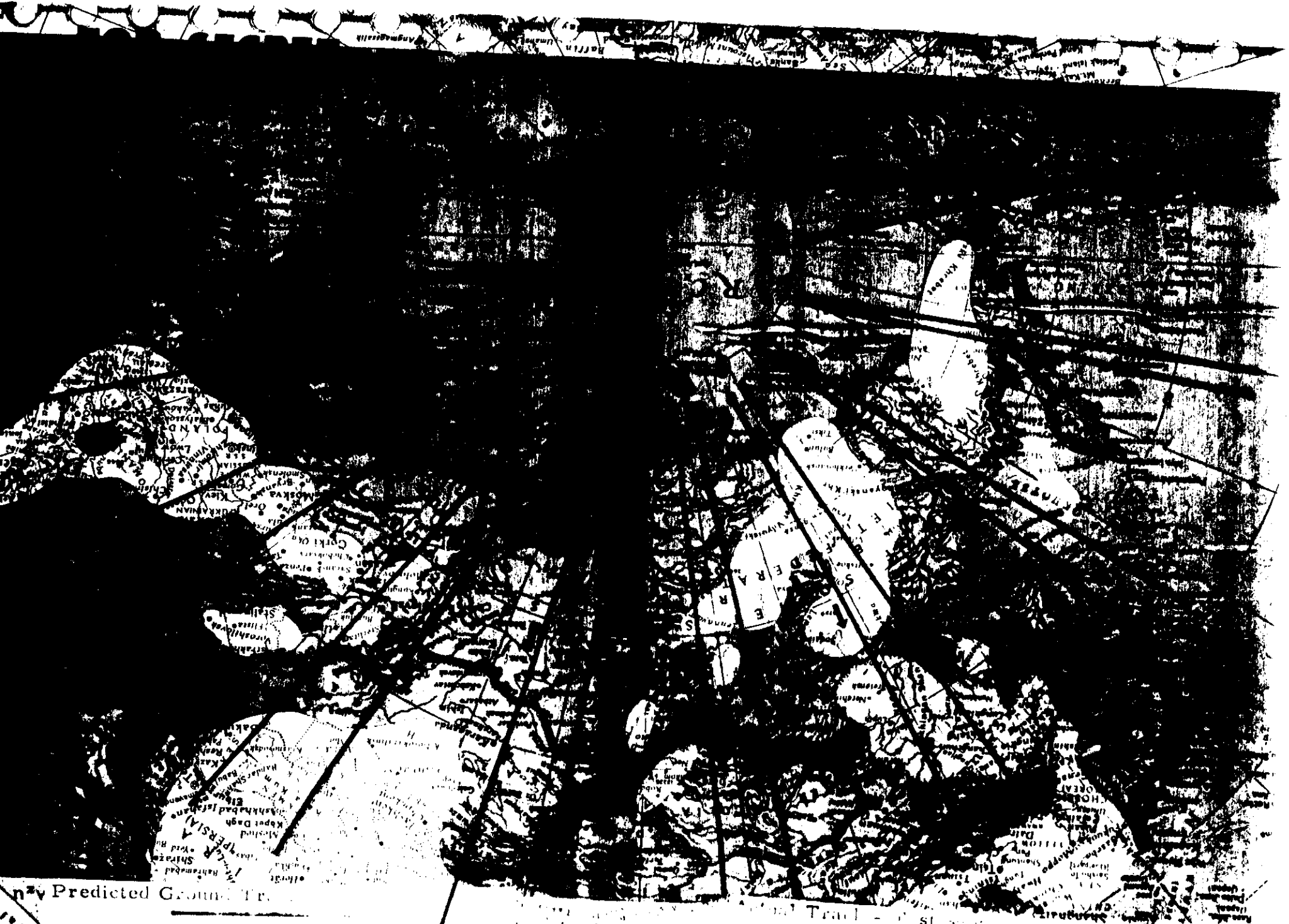
14/1818Z L+21 hours	Receipt of special status report indicating command control of vehicle has been lost. Recovery operation cancelled due to capsule impact predicted in area 500 miles north of Spitzberg Islands at 15/0018Z.
14/2118Z L+24 hours	Receipt of second status report. Orbital time 90.5 minutes vs. 94.5 minutes predicted. Actual ephemeris indicates each pass falls successively further to the East of predicted path.
15/2000Z L+47 hours	Receipt of special status report. The [redacted] tracked vehicle and received telemetry on pass 24 and 25. Good data with positive indication of capsule separation. On the 26th pass, no telemetry received indicating batteries dead. Also unconfirmed report from Norway of flash in sky followed by report of parachute descending in Spitzberg Island area. Air Force investigating.
16 April	Brief post mortem. Launch was successful with vehicle going into polar orbit of shorter duration than anticipated. Vehicle was stabilized, command control initially established and the capsule did separate. Separation occurred at wrong time because the programmer could not be changed from predicted to the actual orbit time. Programmer was over-controlled by [redacted] tracking station in an attempt to adjust to differenc in actual vs. predicted orbital time. An automatic feature of the programmer causes it to slip back to the predicted time wh so over-controlled. Since programmer is set to receive commands only during certain times, command control was not achieved again because when the vehicle was in range of our ground stations, the programmer would not accept the signals. (Results of programmer operating on predicted, not actual, time.) Based on the predicted time the programmer automatically orders the recovery process to commence resulting in capsule release in the wrong area. A review of actual weather conditions over the target area during orbital time indicated 3000 nm of flight lines with 3/8 or less cloud cover. From a photo reconnaissance standpoint, correct programmer timing being achieved and recovery accomplished, this would have be considered a successful mission.

Chronological Sequence of Events
CORONA Mission 9001 - June 59

Date/Time	Event
20 May L- 33 days	Receipt by Headquarters of ephemeris date (Ground Track)
22 May L- 35 days	Selection of film type and camera setting, camera on off points, and launch time limits by Headquarters. Info dispatched to Palo Alto.
19 June L- 5 days	Headquarters received 1st Daily Status with ETL of 23/1800Z (launch set for earliest time authorized by Headquarters.)
22/1500Z L- 30 hours	Headquarters considered target weather (3800NM of flight lines in 3/8 or less cloud cover.)
23/1200Z L- 6 hours	Headquarters took final look at weather (3200NM of flight lines in 3/8 or less with good possibility of small areas opening in Urals and Western Russia) Approval Sent.
23/1500Z	Back up weather (for launch on 24th). Considered - Weather had deteriated.
23/1700Z	Receipt of [redacted] (Status Report) - Holding at L minus 95 minutes because range safety line out - Vehicle condition excellent.
23/1800 to 1900Z	Receipt of several [redacted] indicating still holding for range safety lines.
23/1950Z	Receipt of [redacted] (Abort Report). Launch rescheduled to 25/1800Z. Reason given was range safety lines out and 48 hours required for repair - necessary rescheduling and notification at Headquarters was performed.
24/1500Z	Considered target weather (2000NM in 3/8 or less).
24/2100Z	Daily Status Report received reconfirming ETL on 25/1800Z.

Continued

Date/Time	Event
25/1200Z	Considered final weather - some improvement over forecast made on 24th - 2400 NM in 3/8 or less - probability of additional small areas in Central and North Central USSR.
25/1700Z	Receipt of [redacted] indicating now ETL of 25/1900Z because of minor technical delays - Launch prospects excellent.
25/1800Z	Series of holds caused by small technical problems, pressurization, fueling problems and beacon problems.
25/2250Z	Launch occurred with initial data indicating a successful launch.
26/0110Z L plus 2:20	1st Progress Report indicated vehicle probably did not go into orbit.
26/0240Z 1 plus 4:00	2nd Progress Report indicated definite failure of vehicle to go into orbit.
26 June	Brief post mortem - Exact reason for failure to orbit unknown at this time. Departure azimuth 4 degrees west of planned which would decrease boost given by rotation of earth. THOR trajectory was lower than nominal. Insertion velocity was 25,605 Ft/sec. vs 25,691 Ft planned. Actual weather in target area would have permitted 3500NM of photography.


Predicted
Estimated
Orbital
Actual
Clear

Time of Year Limitations on Project CORONA

Factors

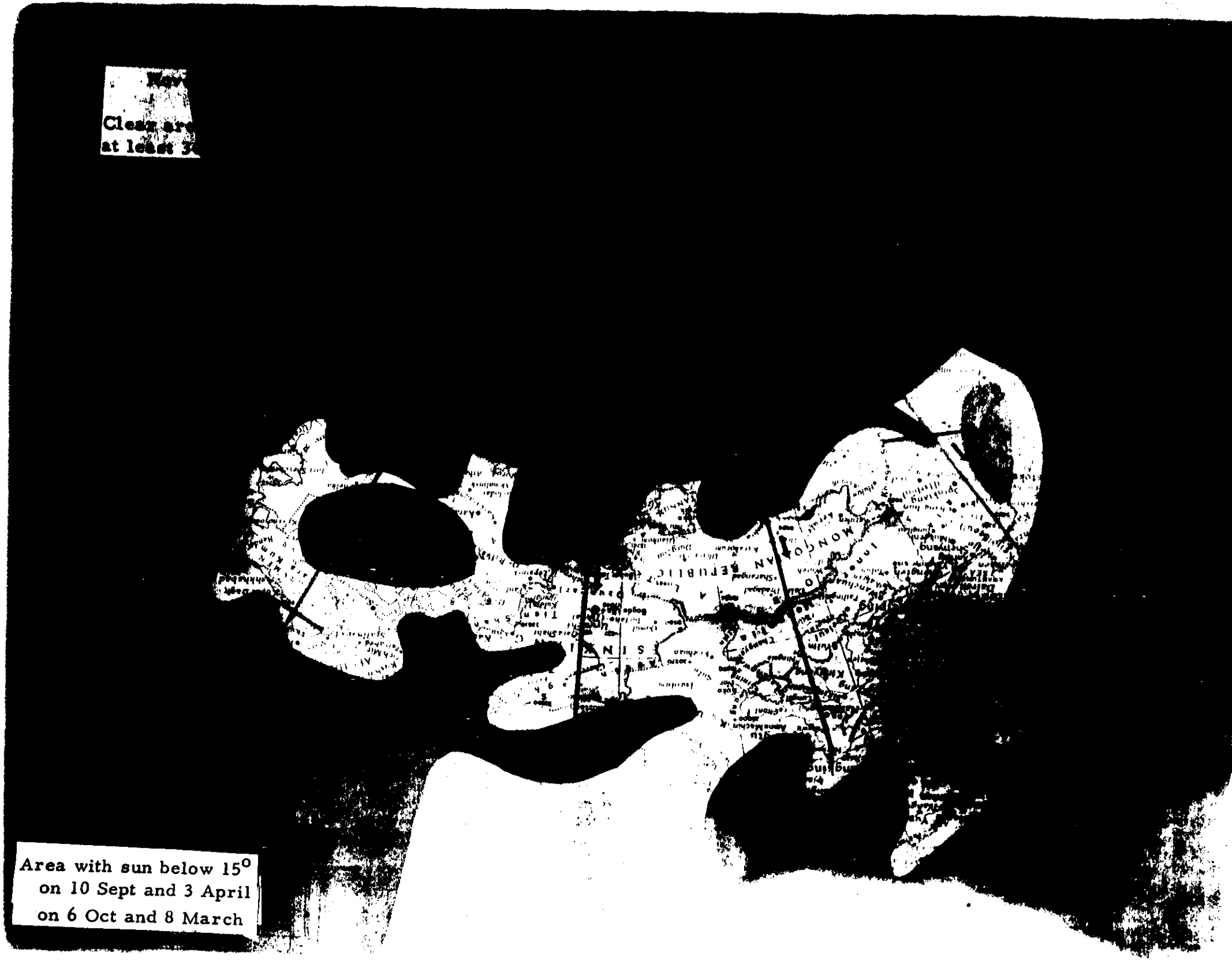
1. Vehicle in one day polar orbit.
2. USSR and European satellites considered only areas justifying CORONA coverage.
3. Concentration of priority areas between 50° and 60° N latitude.
4. Total vehicle linear flight line coverage in desired area equals 13,000 nm.
5. Film supply will provide for 12,000 linear miles of flight line.
6. Minimum acceptable sun altitude is 15°.
7. Weather variable but will reduce nm of flight lines open to photography by approximately 50%.

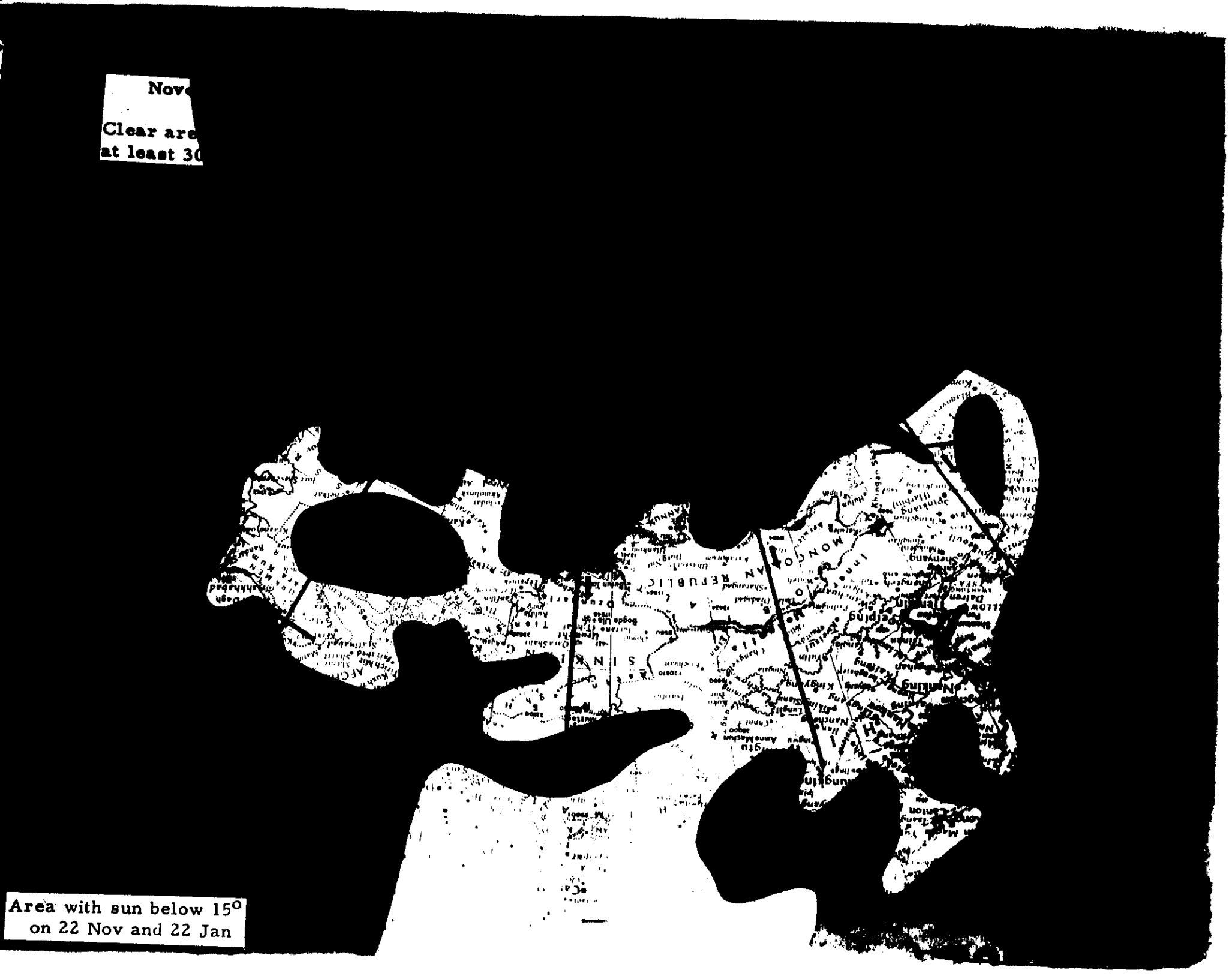
Limitations Imposed by Above Factors (except weather)

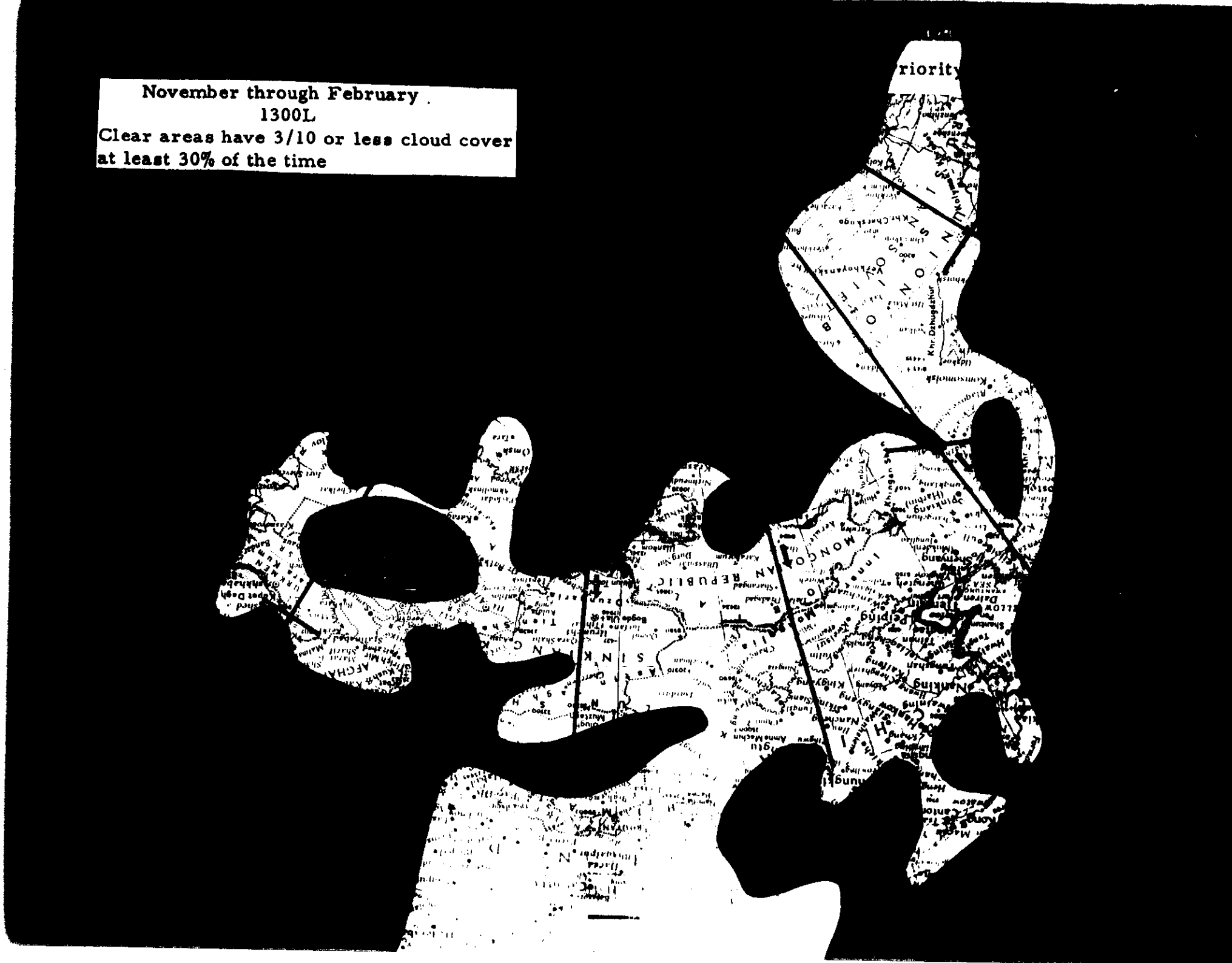
1. 3 April to 10 September - no limitations.
2. On 6 October and on 8 March - no photography above 70° N latitude - 9,000 nm flight lines available.
3. On 3 November and on 8 February - no photography above 60° N latitude - 5,000 nm flight lines available.
4. On 22 November and 22 January - no photography above 55° N latitude - 3,600 nm flight lines available.

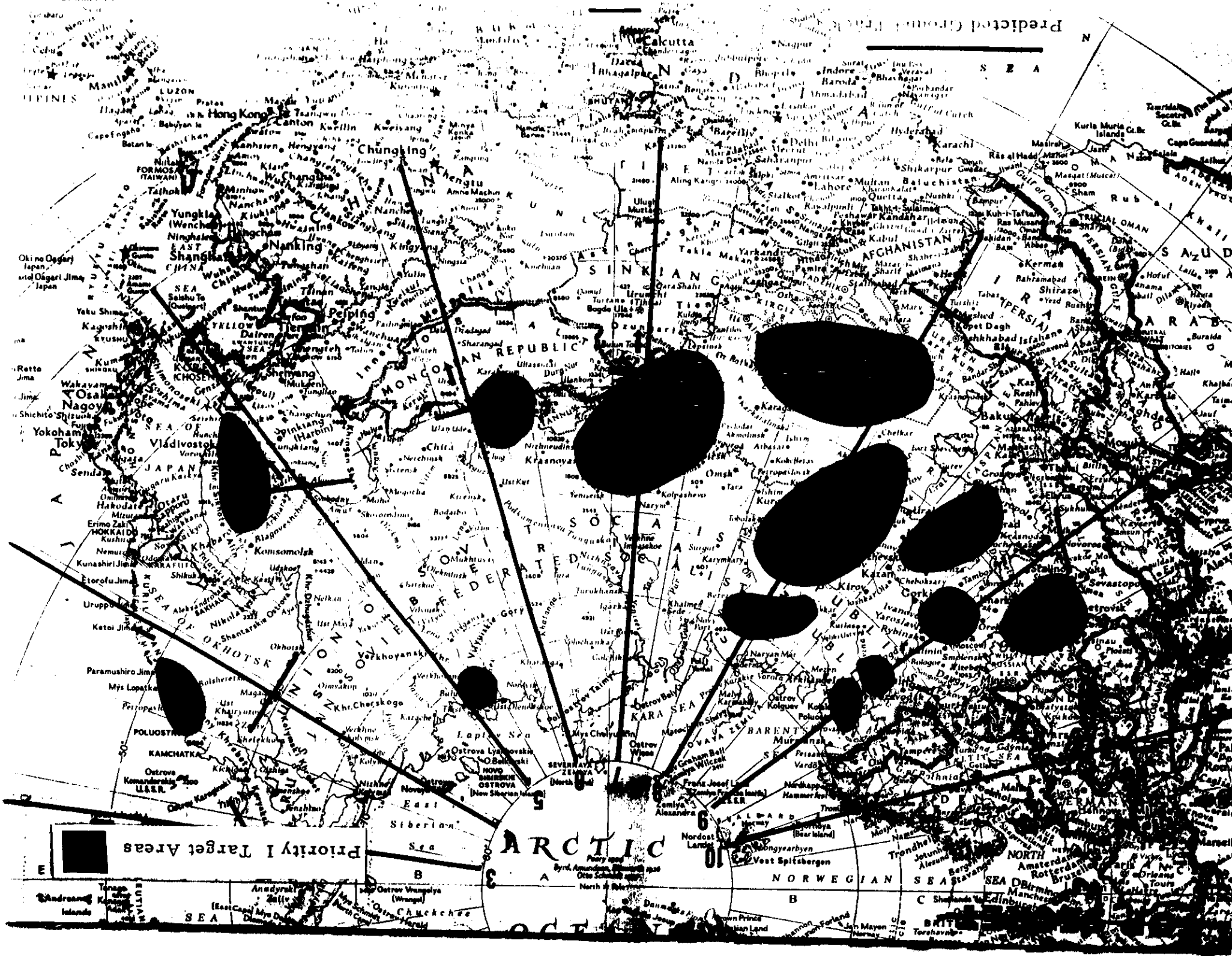
Recommendations

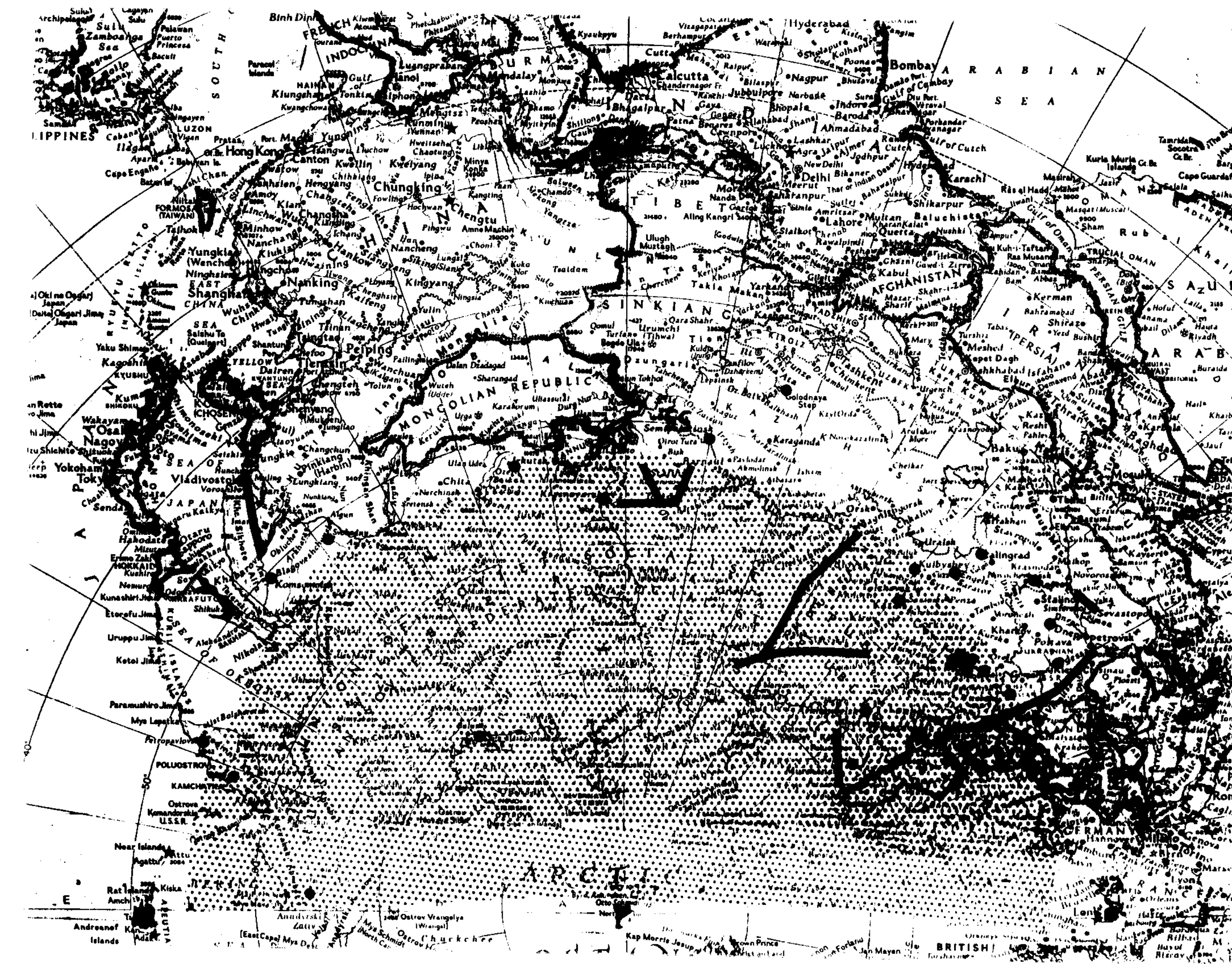
1. The present schedule should be either contracted or expanded to preclude CORONA photo launches within period early November to mid-February.
2. Shift target areas to South, i.e., China, Tibet, Mongolia, Indo China.
3. Vary launch azimuth (inclination angle) to allow longer passes over USSR below 60° N latitude.
4. Use an alternate payload of interest to the Intelligence Community.
5. Use an alternate payload of scientific interest and useful in advancing our cover story.

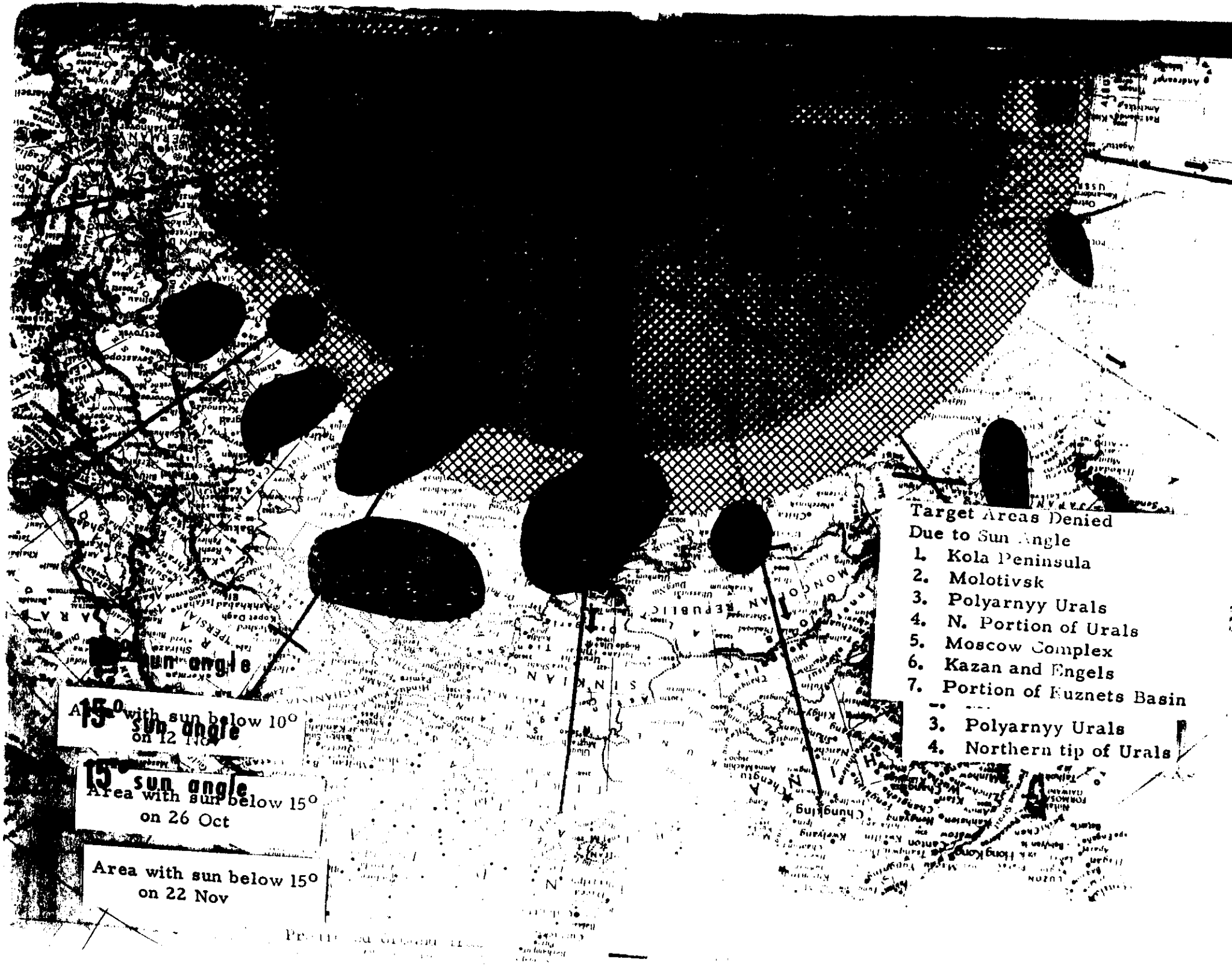

Clear
at least
Area with sun below 15°
on 10 Sept and 3 April
on 6 Oct and 8 March


Nov
Clear are
at least 3
Area with sun below 15°
on 22 Nov and 22 Jan


November through February
1300L
Clear areas have 3/10 or less cloud cover
at least 30% of the time


Priority I Target Areas
ARCTIC
OCEAN
Calcutta
Hong Kong
Canton
Chungking
Chengtu
Nanking
Shanghai
Peiping
Tientsin
Yungkia
Changsha
Hankow
Wuchang
Kiukiang
Nanchang
Foochow
Kweilin
Kweisang
Kunming
Lanchow
Sian
Kaifeng
Hsuchow
Tsinan
Tsingtao
Shenyang
Mukden
Changchun
Kirin
Harbin
Dairen
Port Arthur
Osaka
Nagoya
Yokohama
Tokyo
Vladivostok
Hakodate
Sapporo
Otaru
Nemuro
Kushiro
Komsomolsk
Khabarovsk
Nikolaevsk
Okhotsk
Khr. Cherskogo
Verkhoyansk
Ust Kut
Chita
Irkutsk
Krasnoyarsk
Omsk
Tara
Kolpashevo
Narym
Novosibirsk
Barnaul
Semipalatinsk
Karaganda
Aktyubinsk
Orsk
Chelkar
Kazan
Gorki
Kirov
Moscow
Smolensk
Minsk
Leningrad
Murmansk
Petsamo
Vardö
Archangel
Molotovsk
Kotlas
Vologda
Yaroslavl
Ivanovo
Vyatka
Sverdlovsk
Chelyabinsk
Magnitogorsk
Kuibyshev
Saratov
Stalingrad
Astrakhan
Gurev
Sevastopol
Odessa
Kharkov
Kiev
Lvov
Warsaw
Gdynia
Danzig
Berlin
Hamburg
Amsterdam
Rotterdam
Brussels
Birmingham
Manchester
Edinburgh
Shetland Is.
Stavanger
Trondheim
Narvik
Tromsö
Hammerfest
Nordkapp
Bear Island
Franz Josef Land
Zemlya Alexandra
Graham Bell
Wilczek
Severnaya Zemlya
North Cape
Novaya Zemlya
Vaygach
Kara Sea
Barents Sea
Laptev Sea
East Siberian Sea
Kamchatka
Paramushiro Jima
Shikotan
Etorofu Jima
Kunashiri Jima
Hokkaido
Honshu
Kyushu
Shikoku
Formosa (Taiwan)
Luzon
Manila
Tsingtao
Yellow Sea
Sea of Japan
Sea of Okhotsk
Bering Sea
Aleutian Islands
Andreanof Islands
Anadyrskiy Zaliv
Ostrov Wrangelya (Wrangel)
Chukchee Sea
Ostrova Komandorskiye
Ostrova Lyakhovskiye
Novosibirskiye Ostrova
Ostrov Vize
Ostrov Kolguev
Ostrov Belyy
Mys Chelyuskin
Mys Lopatka
Nordaustlandet
Spitsbergen
Jan Mayen
Norwegian Sea
Greenland Sea
Barents Sea
Kara Sea
Laptev Sea
East Siberian Sea
Chukchee Sea
Bering Sea
Sea of Okhotsk
Sea of Japan
Yellow Sea
Inner Mongolian People's Republic
Union of Soviet Socialist Republics
Afghanistan
Persia
Arabian Sea
Persian Gulf
Gulf of Oman
Trucial Oman
Saudi Arabia
Iraq
Turkey
Baku
Tehran
Isfahan
Shiraz
Bahrain
Karachi
Lahore
Delhi
Calcutta
Bhutan
Nepal
Burma
Thailand
Indochina
Philippines
Japan
China
Sinkiang
Tibet
Mongolia
Manchuria
Korea
Kamchatka
Siberia
Europe
Asia
Africa
Arabia
North America
South America
Australia
Pacific Ocean
Indian Ocean
Atlantic Ocean
Arctic Ocean
Mediterranean Sea
Red Sea
Black Sea
Caspian Sea
Aral Sea
Lake Baikal
Lake Balkhash
Lake Issyk-Kul
Lake Tana
Lake Victoria
Lake Tanganyika
Lake Nyasa
Lake Rudolf
Lake Chad
Lake Eyre
Lake Torrens
Lake Gairdner
Lake Amadeus
Lake Mackay
Lake Frome
Lake Blanche
Lake Callabonna
Lake Hope
Lake Tyrrell
Lake Corangamite
Lake Colac
Lake Bolac
Lake Wallace
Lake Grace
Lake Brown
Lake Moore
Lake Barlee
Lake Ballard
Lake Carnegie
Lake Disappointment
Lake Macleod
Lake Eyre
Lake Torrens
Lake Gairdner
Lake Amadeus
Lake Mackay
Lake Frome
Lake Blanche
Lake Callabonna
Lake Hope
Lake Tyrrell
Lake Corangamite
Lake Colac
Lake Bolac
Lake Wallace
Lake Grace
Lake Brown
Lake Moore
Lake Barlee
Lake Ballard
Lake Carnegie
Lake Disappointment
Lake Macleod


ARABIAN SEA
Bombay
Hyderabad
Calcutta
Nagpur
Delhi
Karachi
Lahore
Ahmadabad
Gulf of Cambay
Gulf of Cutch
Gulf of Oman
PERSIAN GULF
TRUCIAL OMAN
AFGHANISTAN
Kabul
Kandahar
Baluchistan
Shikarpur
Multan
Quetta
TIBET
SINKIANG
Urumchi
Takla Makan
Yarkand
Kashgar
Tashkent
Samarkand
Alma Ata
Frunze
Karaganda
Semipalatinsk
Barnaul
MONGOLIAN REPUBLIC
Dzungaria
Chungking
Chengtu
Kunming
Nanking
Hankow
Shanghai
Peiping
Tientsin
Canton
Hong Kong
Dairen
Mukden
Harbin
Vladivostok
Khabarovsk
Komsomolsk
Sakhalin
Kuril Islands
Hokkaido
Kyushu
Shikoku
Yokohama
Tokyo
Nagoya
Osaka
Sapporo
Hakodate
Niigata
SEA OF JAPAN
YELLOW SEA
EAST CHINA SEA
FORMOSA (TAIWAN)
LUZON
PHILIPPINES
Sulu Sea
Zamboanga
HAINAN
Gulf of Tonkin
Hanoi
INDOCHINA
BURMA
Mandalay
Luangprabang
Kamchatka
Petropavlovsk
Aleutian Islands
Near Islands
Rat Islands
Andreanof Islands
Chita
Irkutsk
Nerchinsk
Ulan Ude
IRAN (PERSIA)
Tehran
Isfahan
Shiraz
Kerman
Meshed
Baghdad
Baku
Stalingrad
Kharkov
Poltava
Stalino
Sevastopol
Krasnodar
Novorossiisk
Kuibyshev
Penza
Saratov
Chkalov
Orsk
ARCTIC
Ostrov Vrangelya (Wrangel)
Chukchee Sea
Kap Morris Jesup
Jan Mayen
BRITISH
Milano
Genova
Roma
Lyon
London


Target Areas Denied
Due to Sun Angle
1. Kola Peninsula
2. Molotivsk
3. Polyarnyy Urals
4. N. Portion of Urals
5. Moscow Complex
6. Kazan and Engels
7. Portion of Kuznets Basin
3. Polyarnyy Urals
4. Northern tip of Urals
15° sun angle
Area with sun below 15° on 12 Nov
15° sun angle
Area with sun below 15° on 26 Oct
Area with sun below 15° on 22 Nov

Predicted Ground Track
Target Areas Denied
Due to Sun Angles
1. Kola Peninsula
2. Molotovsk
3. Polyarnyy Urals
4. Northern tip of Urals
Area with sun below 10° on 12 Nov