



History of Geospatial Use in the Military



EV478



The Military and Geospatial Operations

- ✓ The military was first to *use* geospatial information in WWI and WWII.
 - ✓ Principles of image interpretation (air photos) developed by the allied military forces primarily the British.
 - ✓ First venture into invisible wavelengths, camouflage detection film, 1940's.
 - ✓ First use of thermal infrared to detect heat from vehicles and people, declassified about 1963.
- ✓ Military applications extremely important on today's battlefield.



Historical Events for NGA

- ✓ 1803 – Lewis and Clark Expedition
- ✓ 1830 – Navy Depot and Charts
- ✓ Early 1900s – WWI Air Photograph use
- ✓ 1943 – Army Air Corps created Map Unit
- ✓ 1960 – Corona satellite program
- ✓ 1961 – National Photographic Interpretation Center established
- ✓ 1972 – Defense Mapping Agency (DMA) created
- ✓ 1996 – National Imagery and Mapping Agency (NIMA) created
- ✓ 2003 – National Geospatial-Intelligence Agency (NGA) created



The Corona Program

- ★ Top Secret program declassified by President Clinton in February 1995
- ★ Took 800,000 high resolution images between 1960-1972
- ★ Used by analysts to locate every ICBM site in the Soviet Union: no missile gap
- ★ Best resolution (<1m) not yet matched by any commercial system
- ★ Ultimately used to produce better maps of the Soviet Union (1:250,000) than they possessed

KH-1, DISCOVERER-A, CORONA

PROGRAM CODE NAME	- DISCOVERER-A
NUMERICAL DESIGNATION	- 162
SPACECRAFT MASS	- 8662-1,902.92 LBS.
LENGTH	- 19.5'
DIAMETER	- 5' Ø
MISSION	- R & D REC. SAT.
OPTICAL SYSTEM DESIGNATION	- KH-1
OPTICAL SYSTEM - CAMERAS (I) C	- G.E. RETURN CAPSULE
RESOLUTION	- 40'
SWATH WIDTH	- N/A
DATA RETURN METHOD	- 1 CAPSULE
LIFETIME	- 1 - DAYS
INCLINATION	- 82.92°
PERIGEE	- 131.19 MILES
APOGEE	- 257.78 MILES
FIRST LAUNCH	- 2-28-59
LAST LAUNCH	- 9-13-60
SUCCESSSES	- 2
FAILURES	- 13
ATTEMPTS	- 15

LOCKHEED AGENA-A

CAMERAS SYSTEM-C

HORIZON EARTH SENSORS

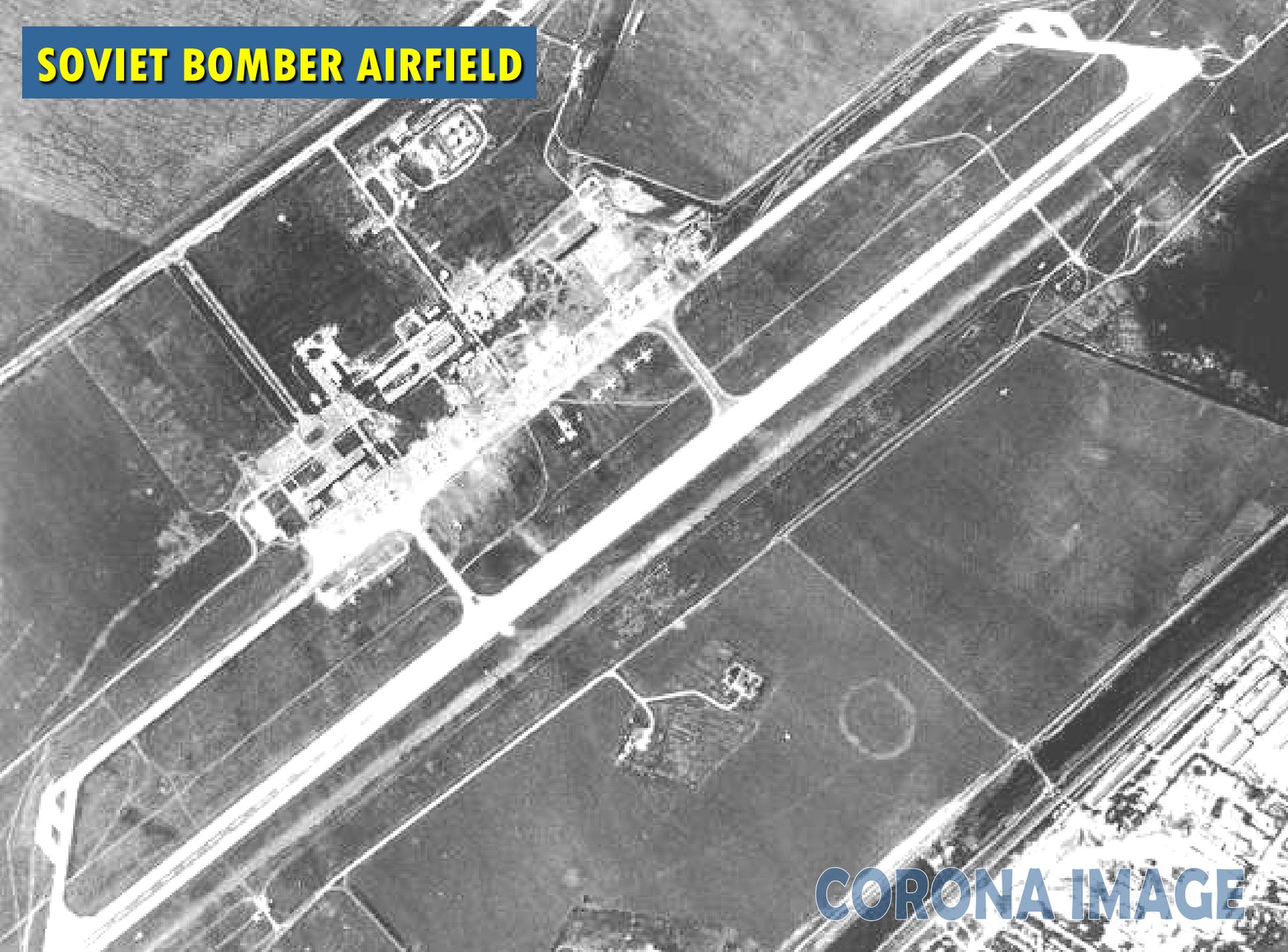
SCALE 0 5 10

SOVIET SS-9 ICBM LAUNCH SITE



CORONA IMAGE

SOVIET BOMBER AIRFIELD



CORONA IMAGE

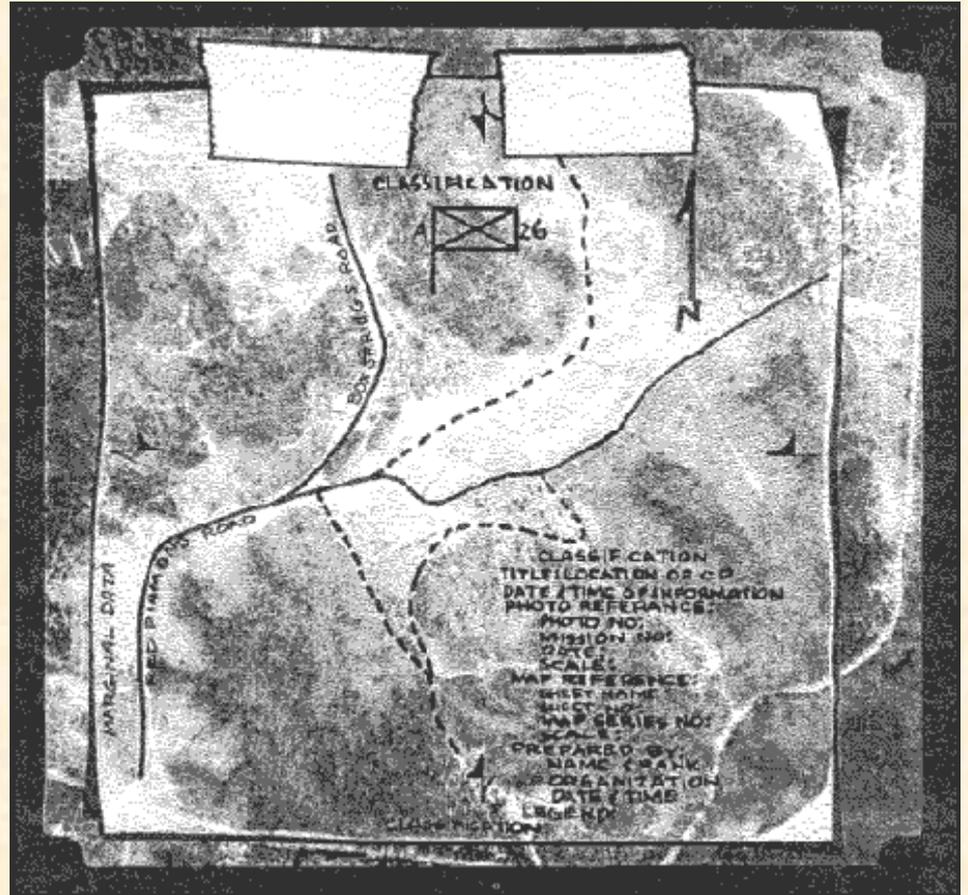
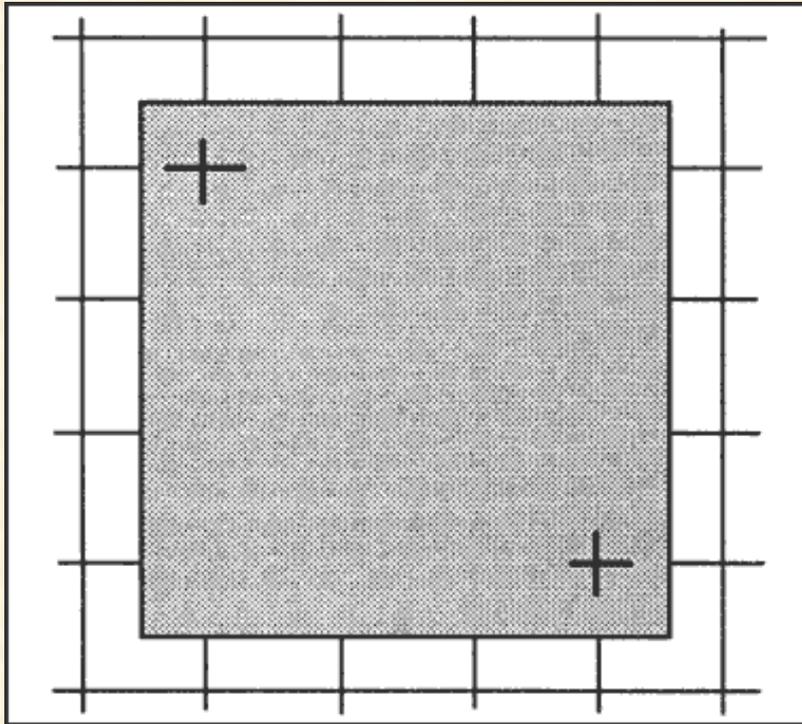


History of NAVSTAR GPS

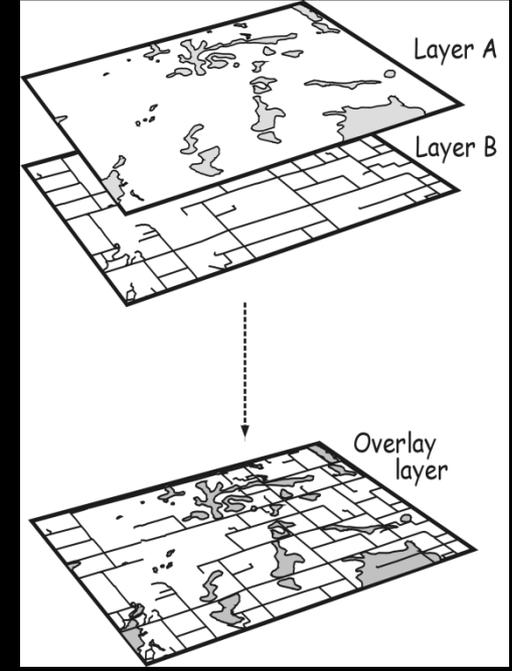
- ✓ 1920s – Origins of Radionavigation
- ✓ Early WWII – LORAN employed
- ✓ 1960 – Raytheon suggests 3-D navigation system
- ✓ 1971-2 – Aerial testing completed in WSMR
- ✓ 1974 – First NAVSTAR Satellite launched
- ✓ Late 1970s-1980s – Satellite constellation established
- ✓ 1993- GPS declared “operational” – no longer “developmental”
- ✓ Late 1990s – GPS made available to civilian users



Map/Photo Overlays



New Enabling Technologies





Digital Equipment

The Army's First Digital Division (4th ID -- Fort Hood, TX)





Inherent Dangers of Open Source Geospatial Information

- ✓ Who has authority to release information collected by national sources/civilian satellite companies?
- ✓ Countries with major concern:
 - ✓ **India**
 - ✓ Thailand
 - ✓ South Korea
 - ✓ United States?
- ✓ Countries with newly acquired capabilities in satellite imaging
 - ✓ Nigeria
 - ✓ China
 - ✓ Brazil