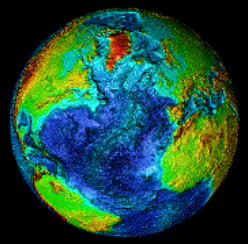
APPLICATIONS OF REMOTE SENSING



M.H. Mohamed Rinos
Lecturer in GIS

Geospatial technology is a multi-disciplinary activity which deals with

- **Remote Sensing**
- **Geographical Information Systems**
- **Global Positioning Systems**

INDIAN IMAGING SYSTEMS

1979/81

BHASKARA VIDICON, SAMIR

1982

RS-D1 SMART SENSOR

1988/91

IRS-1A & 1B LISS-1&2 (72/36M)

1994

IRS-P2

LISS-2

1996

IRS-P3

WiFS, MOS

X-Ray,

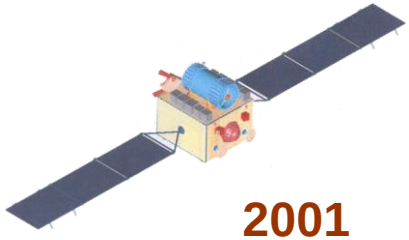
1995/1997

IRS-1C/1D LISS-3 (23/70M,

STEERABLE PAN (5.8 M);

WiFS (188M)

2001



TES

Step & Stare concept

2003

IRS-P6(Resourcesat-1)

LISS III - 23M ; 140 Km; 4Xs

LISS IV - 5.8M ; 3Xs

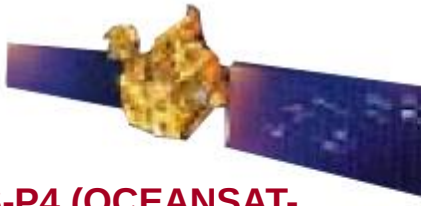
AWiFS - 60M; 740 Km

1999

INSAT-2E

CCD (1 KM)

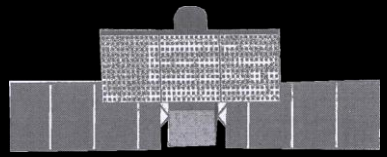
1999



IRS-P4 (OCEANSAT-1)

OCM, MSMR

EO SYSTEM OF INDIA



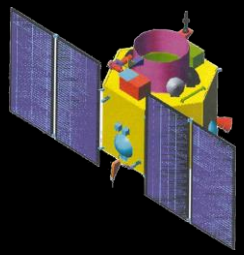
RISAT (2006)

C-band SAR; 3-50 m

Multi-Pol; Multi mode

MEGHA-TROPIQUES (2007)

SAPHIR, SCARAB & MADRAS



CARTOSAT-2 (2005)

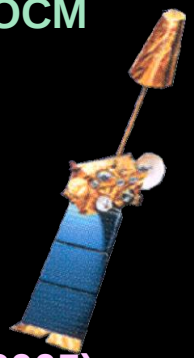
PAN – 1.0 m, 11km

OCEANSAT-II (2006)

SCAT, OCM

IRS-P5(Cartosat-1) (2004)

PAN-2.5M, 30 km, F/A



INSAT 3D (2005)

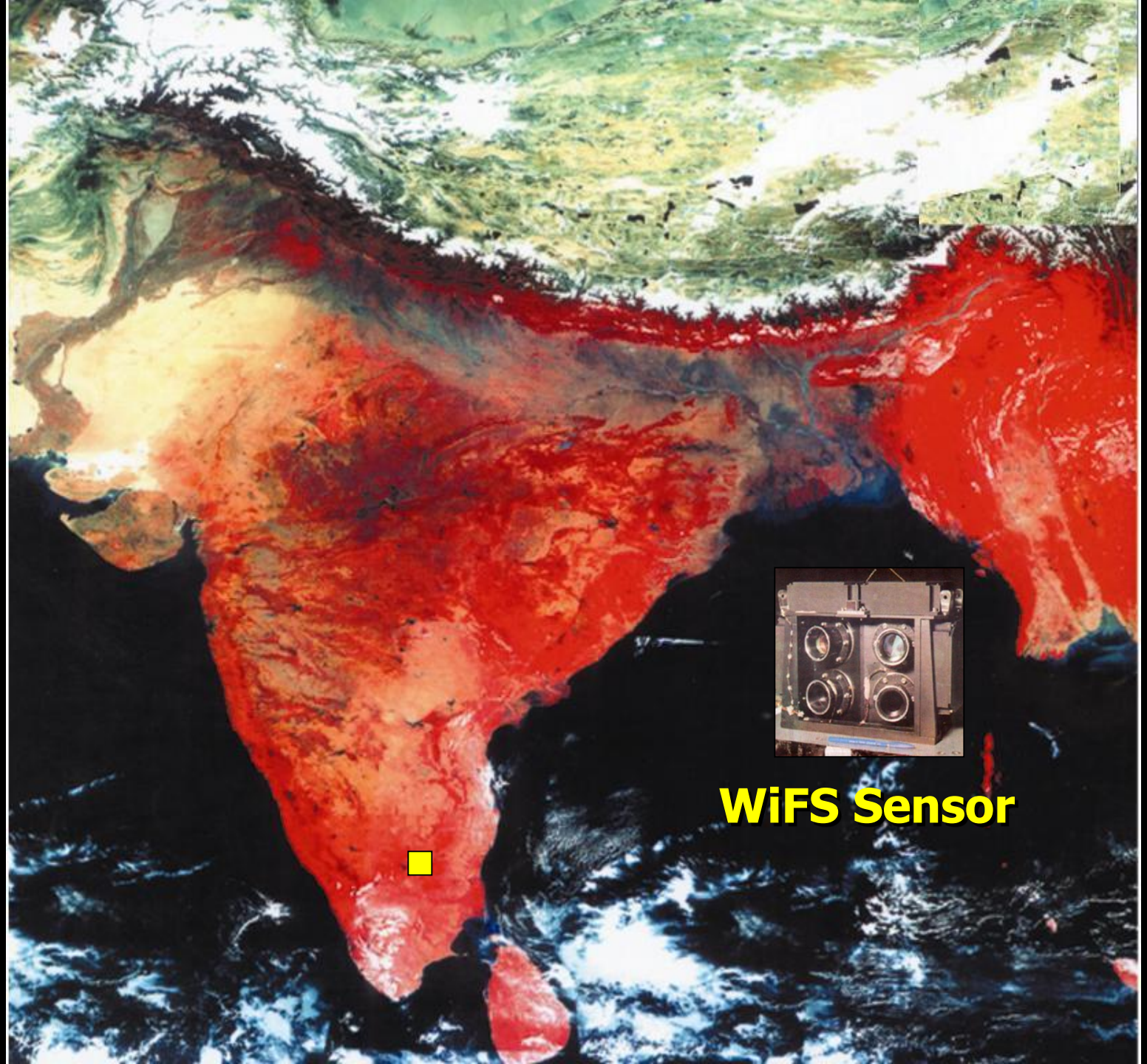
19 Ch. Sounder

6 Ch. Imager

Indian Space Program

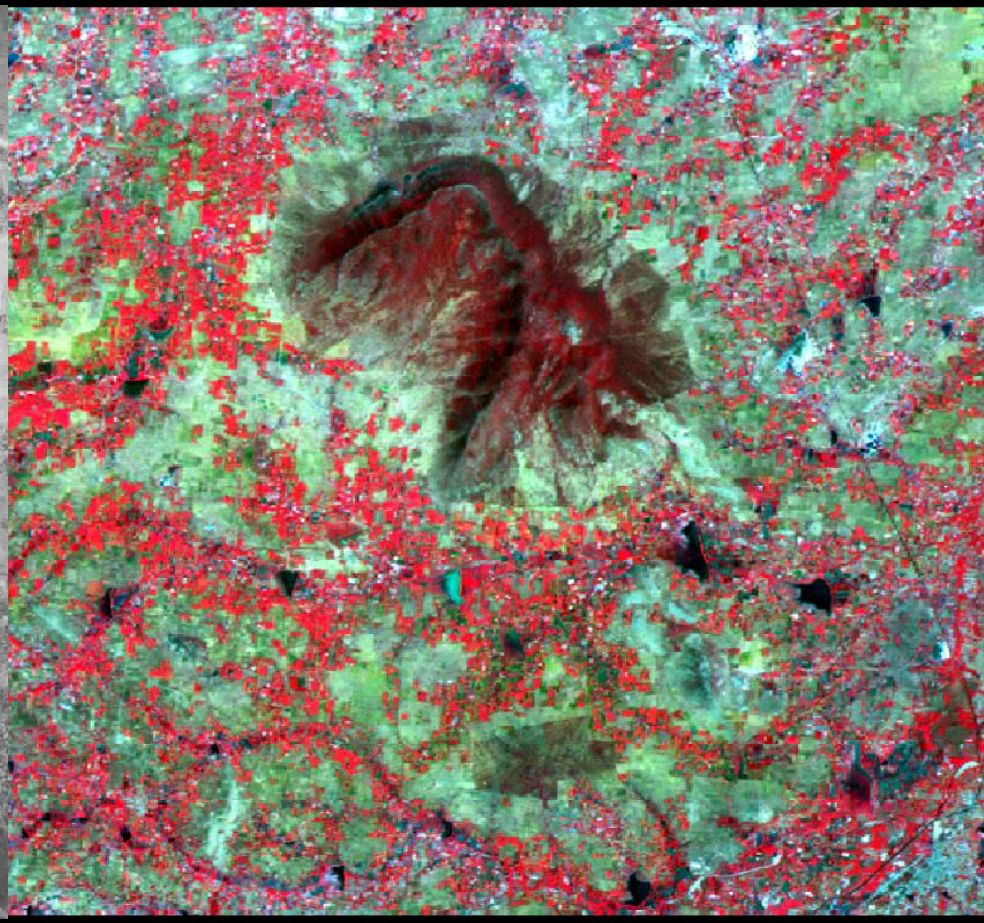
The Indian space program has the goal of harnessing the space technology for applications in the area of

- Communication
- Meteorology
- Search and Rescue operations
- Remote Sensing for resource mapping
- Broadcasting
- Disaster warning
- Defense
- Education
- Cartography

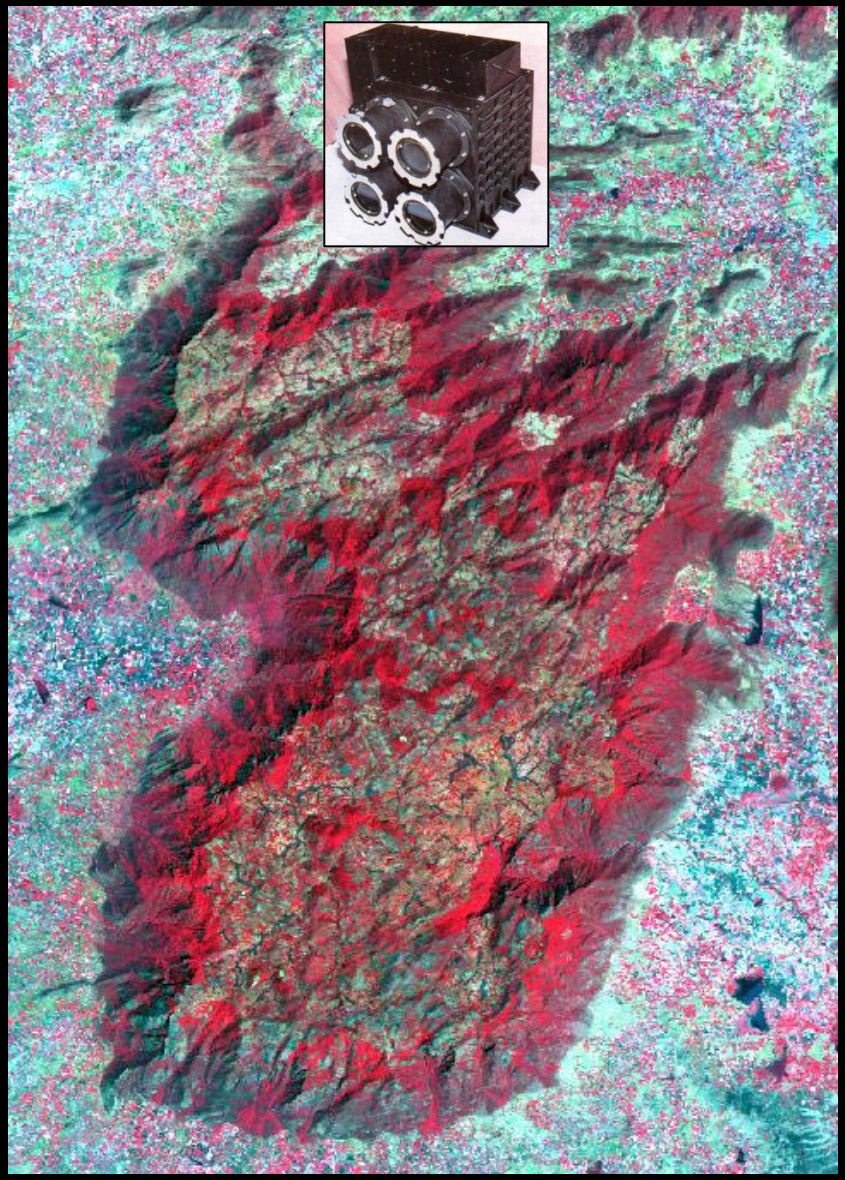

WiFS Sensor

Aerial Photo

Satellite imagery



LISS III Sensor

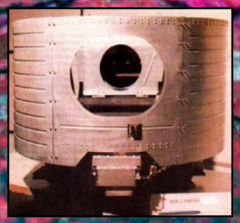


March, 2000

LANDSAT TM

March, 1990

Cauvery river Near Musiri



PAN Sensor

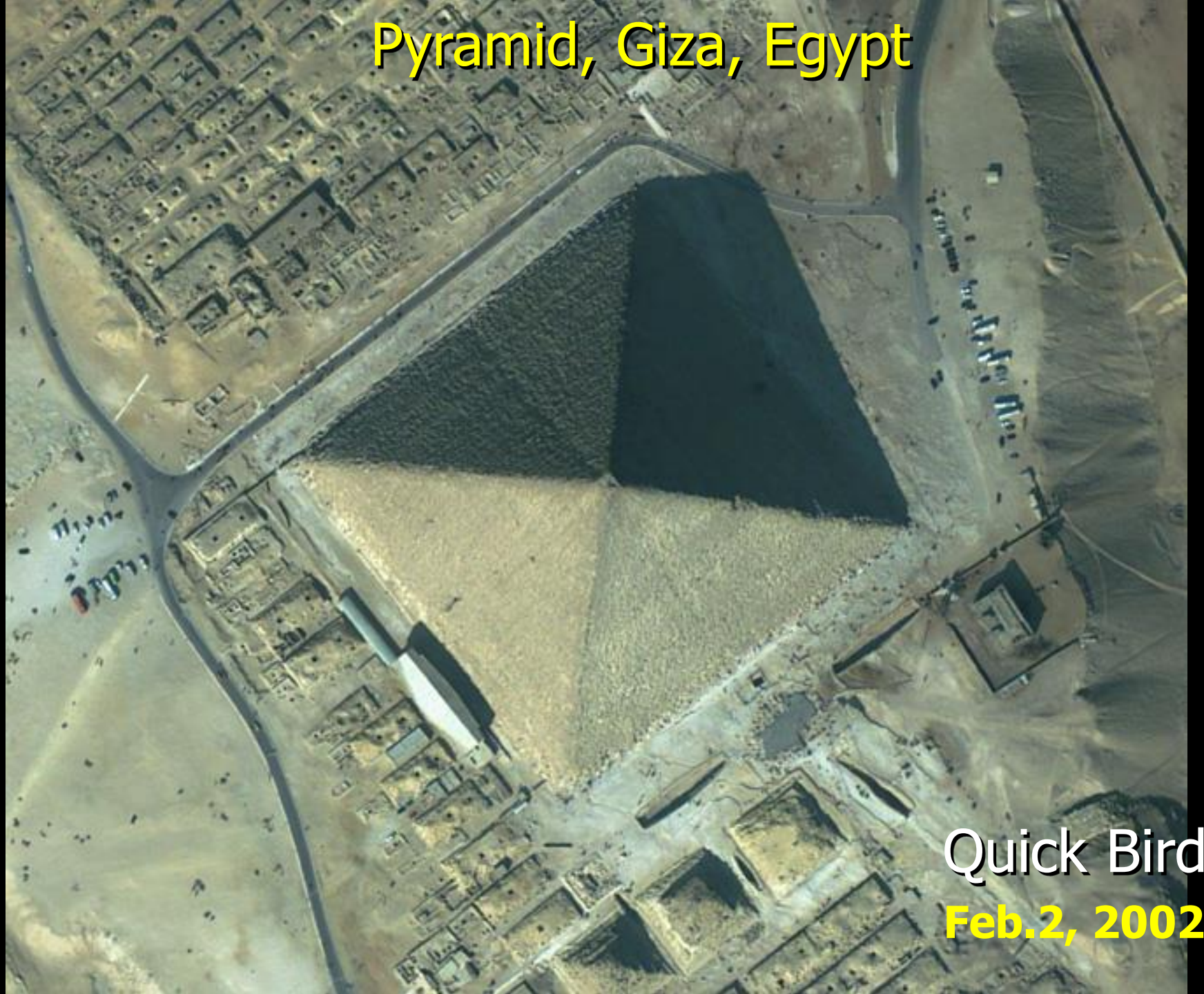
March 2000

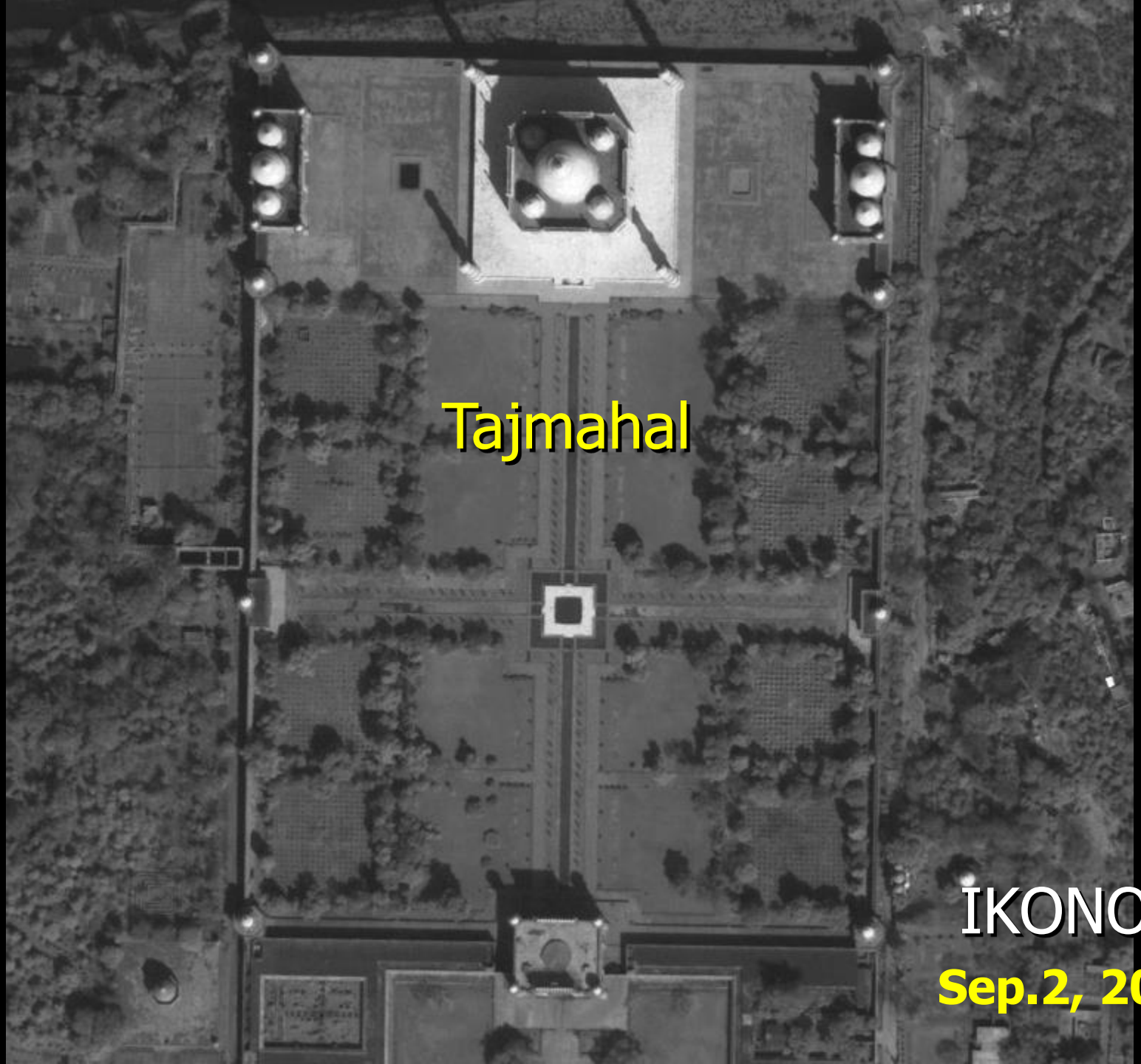

Brussels, Columbia

Statue of Liberty, Manhattan, New York

Quick Bird

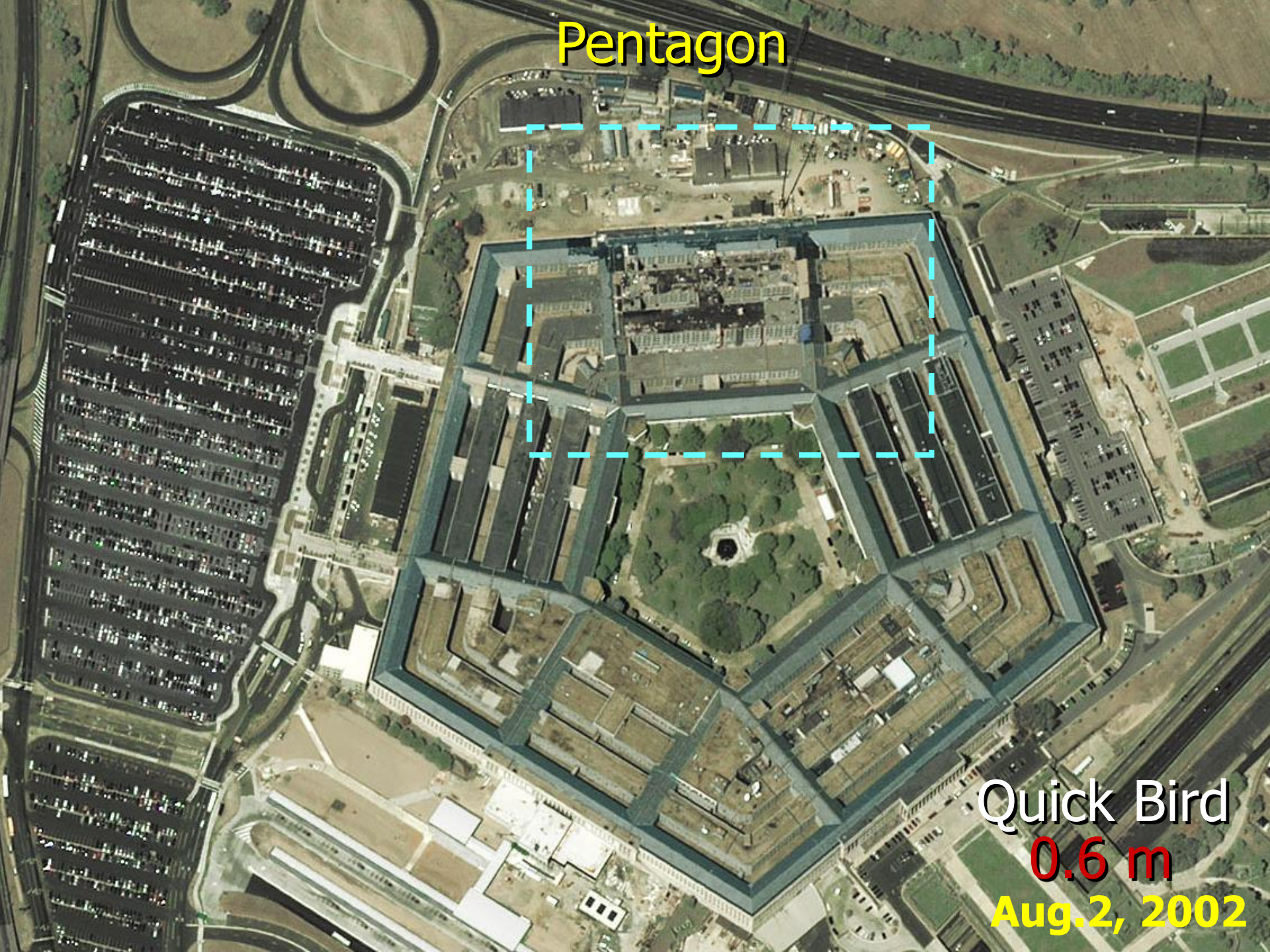
Aug.2, 2002


Pyramid, Giza, Egypt
Quick Bird
Feb.2, 2002


Tajmahal
IKONOS
Sep.2, 2002


Inca, Peru


Manhattan World Trade Centre
Quick Bird
0.6 m
Aug.2, 2002


Pentagon
Quick Bird
0.6 m
Aug.2, 2002

Baghdad Palace


Quick Bird
February 8, 2


San Francisco

Eiffel Tower, Paris, France

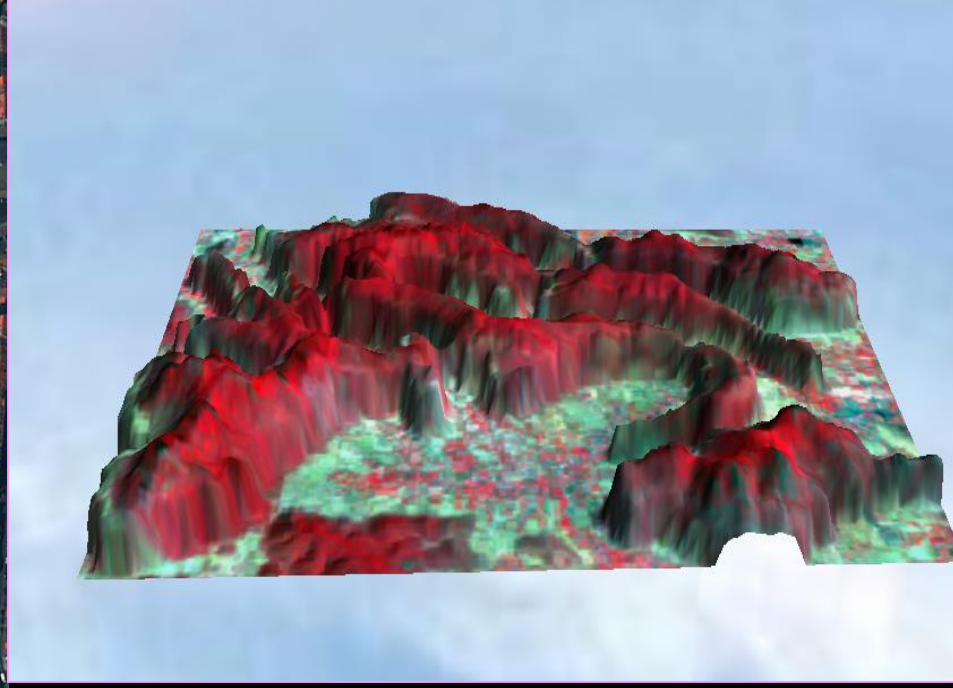

Karachi, Pakistan

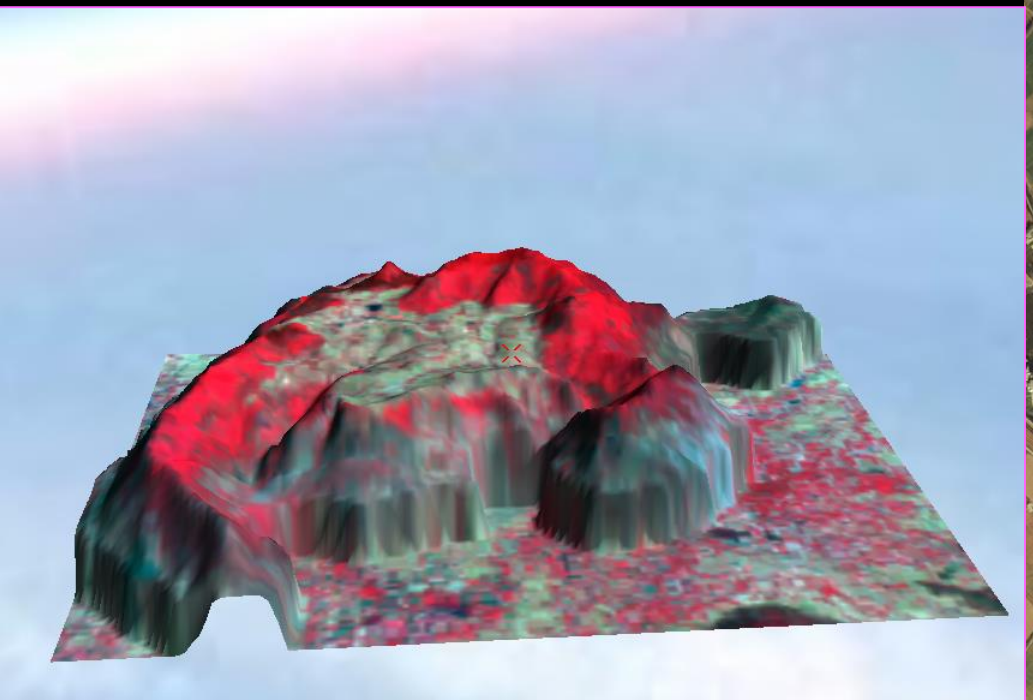

Buckingham Palace, London, England

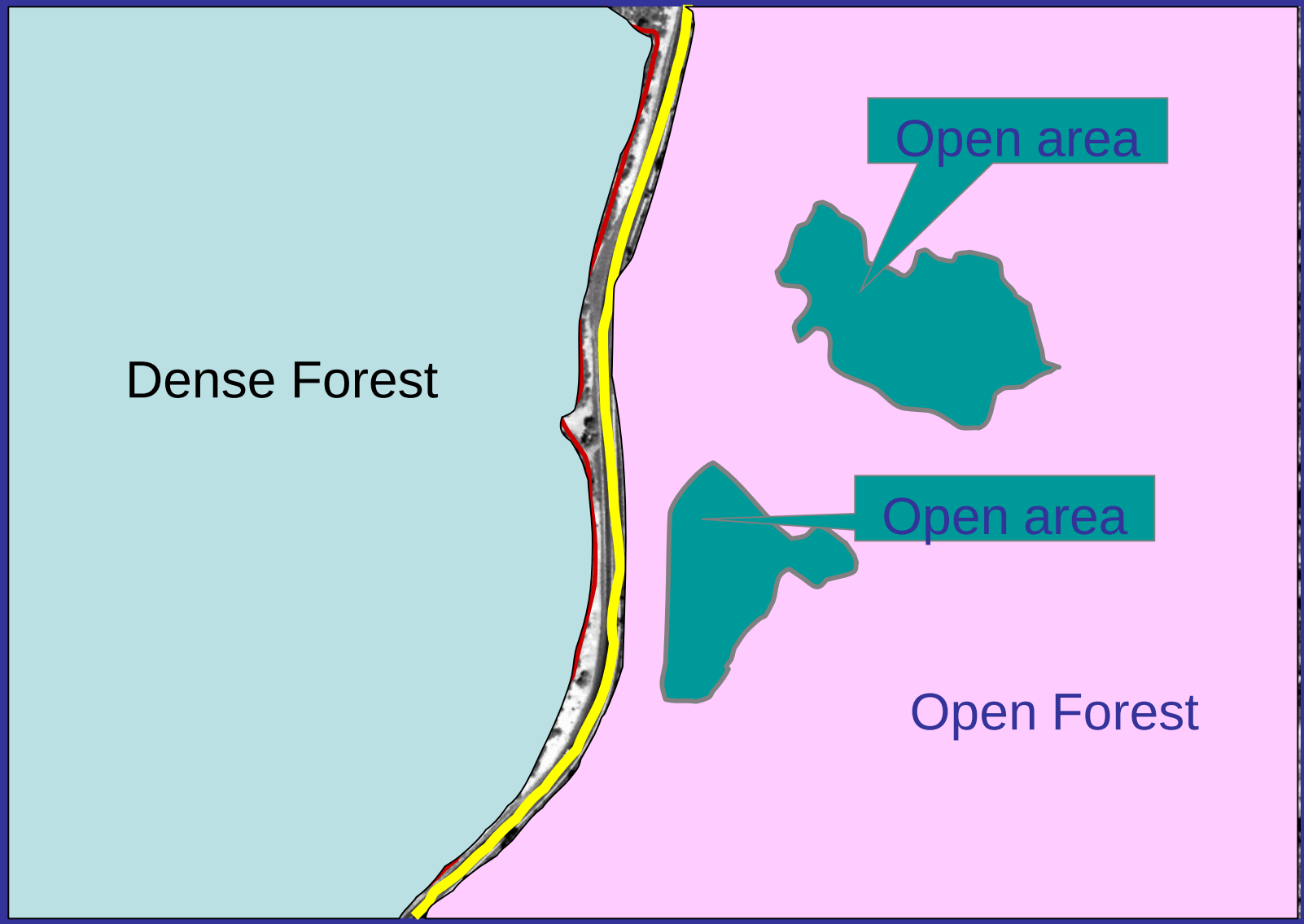

“Boneyard" at the Davis-Monthan
Air Force Base in Tucson,
Arizona


Corn field just outside Corona, California
We Salute Our Troops
September 18, 2003

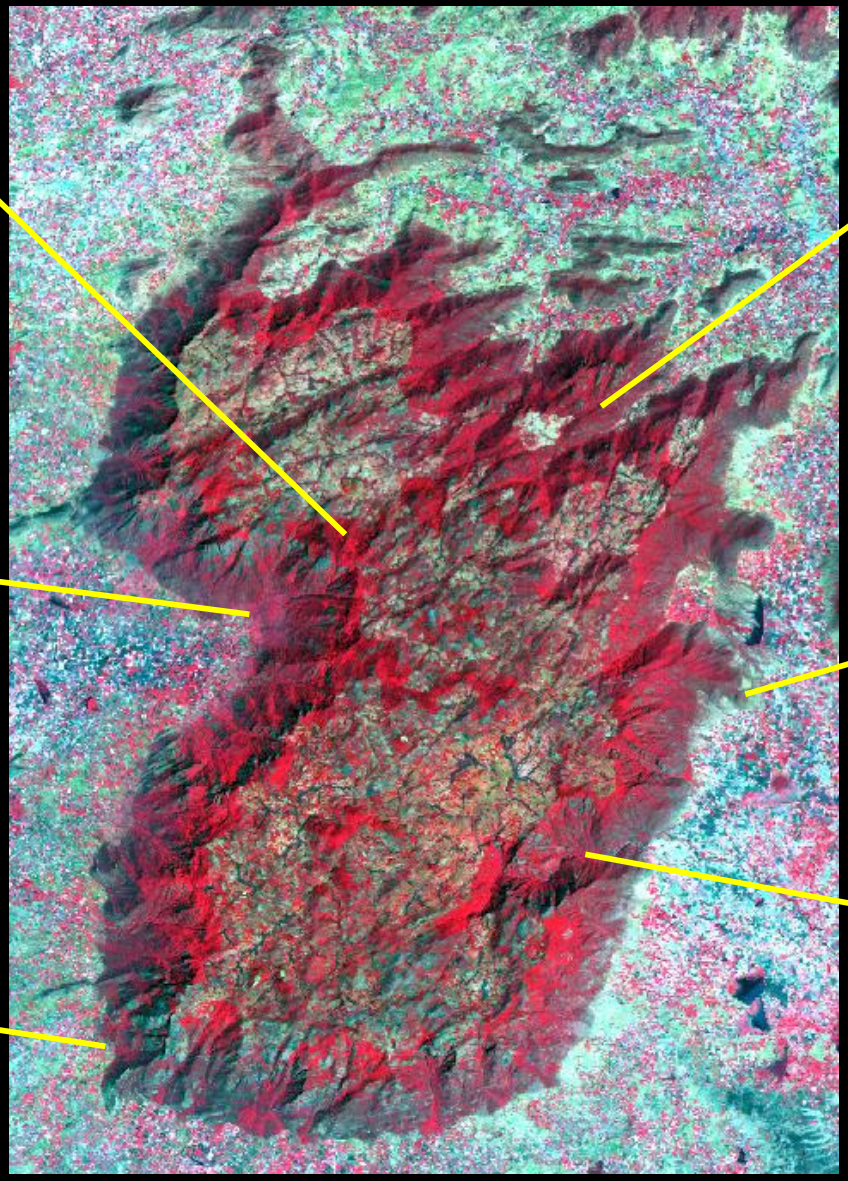
Brussels, Columbia






Dense Forest
Open area
Open area
Open Forest

IRS 1C LISS III - March, 2000



Visual interpretation

Recognizing targets is the key to interpretation and information extraction. Observing the differences between targets and their backgrounds involves comparing different targets based on any, or all, of the visual elements of **tone, shape, size, pattern, texture, shadow, and association**

Visual interpretation

Tone refers to the relative brightness or colour of objects in an image.

Generally, tone is the fundamental element for distinguishing between different targets or features. Variations in tone also allows the elements of shape, texture, and pattern of objects to be distinguished

Visual interpretation

Shape refers to the general form, structure, or outline of individual objects. Shape can be a very distinctive clue for interpretation. Straight edge shapes typically represent urban or agricultural (field) targets, while natural features, such as forest edges, are generally more irregular in shape, except where man has created a road or clear cuts. Farm or crop land irrigated by rotating sprinkler systems would appear as circular shapes

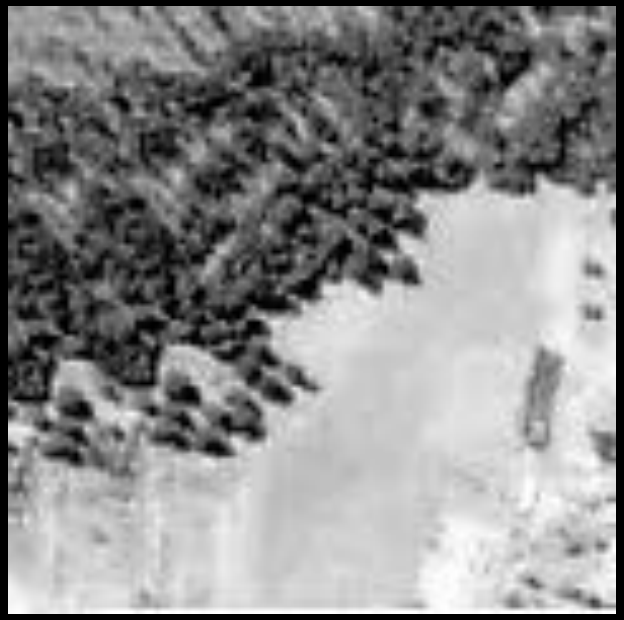
Visual interpretation

Size of objects in an image is a function of scale. It is important to assess the size of a target relative to other objects in a scene, as well as the absolute size, to aid in the interpretation of that target. A quick approximation of target size can direct interpretation to an appropriate result more quickly. For example, if an interpreter had to distinguish zones of land use, and had identified an area with a number of buildings in it, large buildings such as factories or warehouses would suggest commercial property, whereas small buildings would indicate residential use

Visual interpretation

Pattern refers to the spatial arrangement of visibly discernible objects. Typically an orderly repetition of similar tones and textures will produce a distinctive and ultimately recognizable pattern. Orchards with evenly spaced trees, and urban streets with regularly spaced houses are good examples of pattern

Visual interpretation



Texture refers to the arrangement and frequency of tonal variation in particular areas of an image. Rough textures would consist of a mottled tone where the grey levels change abruptly in a small area, whereas smooth textures would have very little tonal variation. Smooth textures are most often the result of uniform, even surfaces, such as fields, asphalt, or grasslands. A target with a rough surface and irregular structure, such as a forest canopy, results in a rough textured appearance. Texture is one of the most important elements for distinguishing features in radar imagery

Visual interpretation

Shadow is also helpful in interpretation as it may provide an idea of the profile and relative height of a target or targets which may make identification easier. However, shadows can also reduce or eliminate interpretation in their area of influence, since targets within shadows are much less (or not at all) discernible from their surroundings. Shadow is also useful for enhancing or identifying topography and landforms, particularly in radar imagery

Visual interpretation

Association takes into account the relationship between other recognizable objects or features in proximity to the target of interest. The identification of features that one would expect to associate with other features may provide information to facilitate identification. In the example given above, commercial properties may be associated with proximity to major transportation routes, whereas residential areas would be associated with schools, playgrounds, and sports fields. In our example, a lake is associated with boats, a marina, and adjacent recreational land

ENVIRONMENT

LANDUSE

WATER

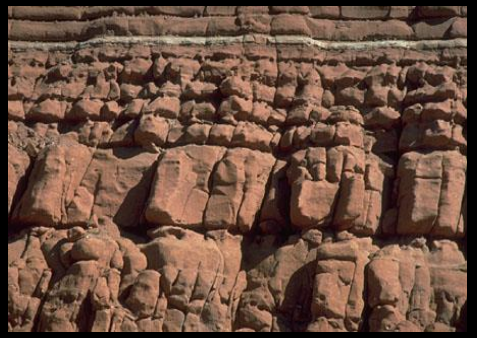
AGRICULTURE

APPLICATIONS OF REMOTE SENSING

SOILS

FORESTS

GEOSCIENCES



OCEANS

APPLICATIONS OF REMOTE SENSING

- Sun synchronous

Resources status on Global, regional and local level

Agriculture

Forestry and Biodiversity

Geology, Structure and minerals

Landform

Land use/land cover

Soil

Water Resources

Disaster

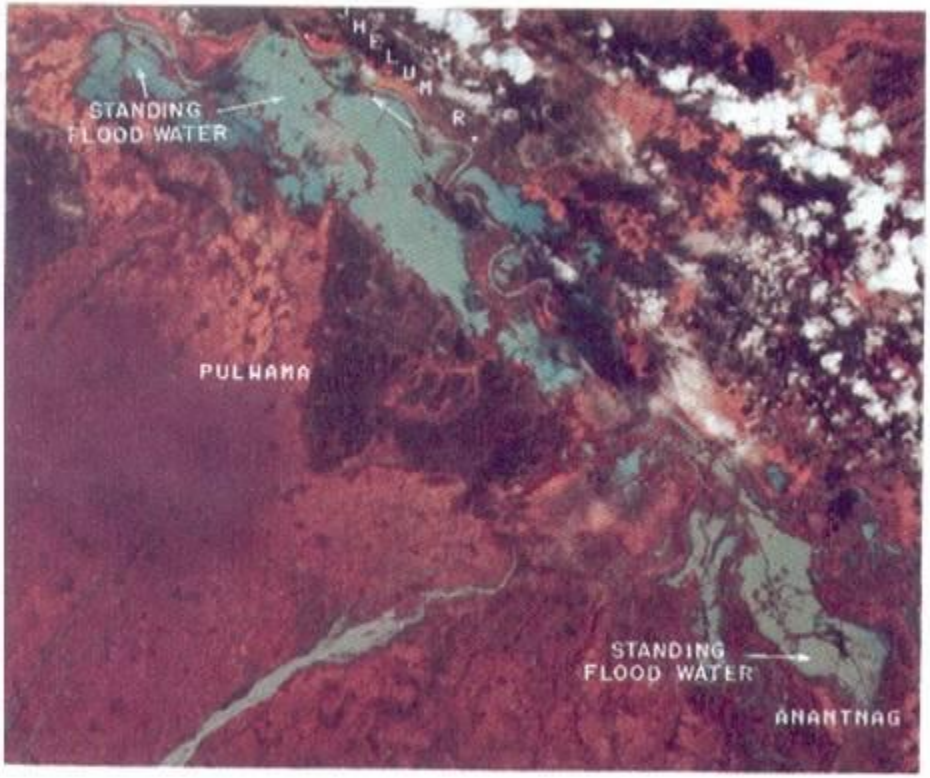
Urban planning

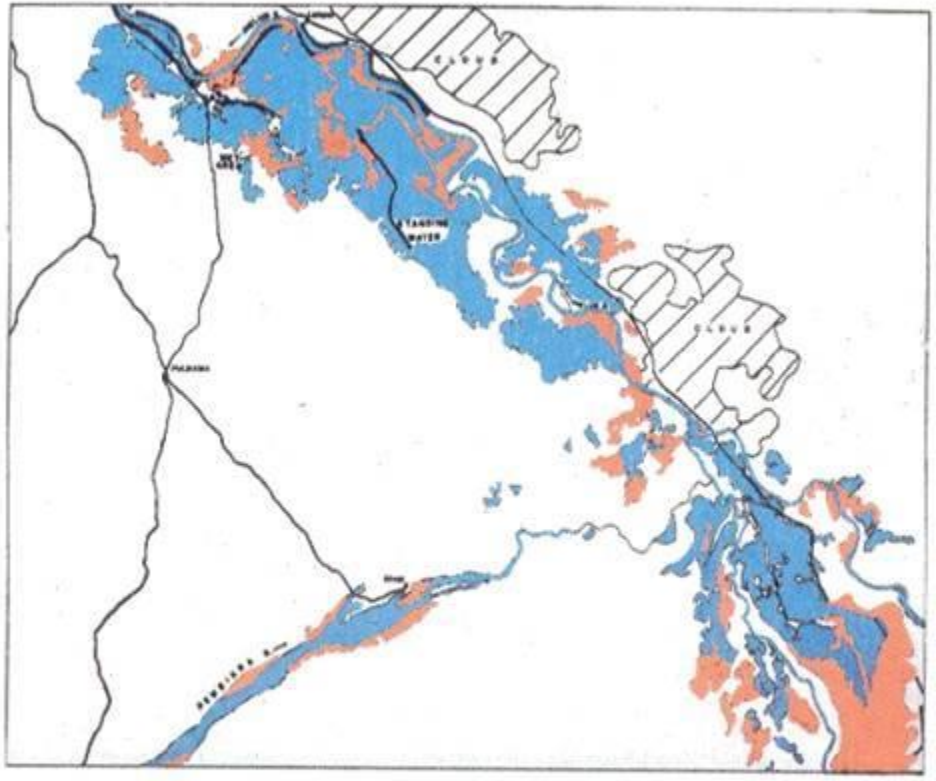
APPLICATIONS OF REMOTE SENSING

- Geo-stationary

Weather forecasting

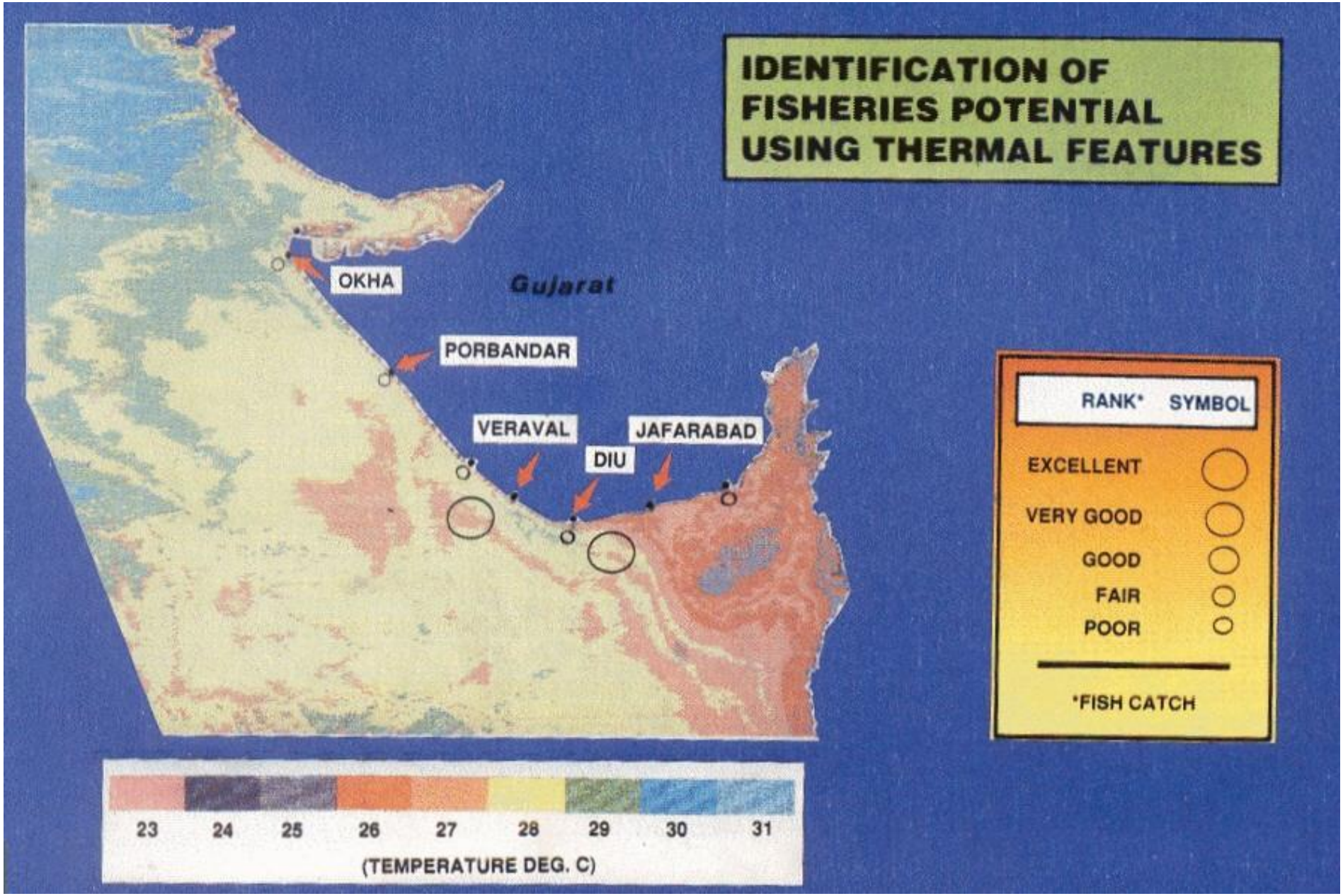
Communication and broadcasting

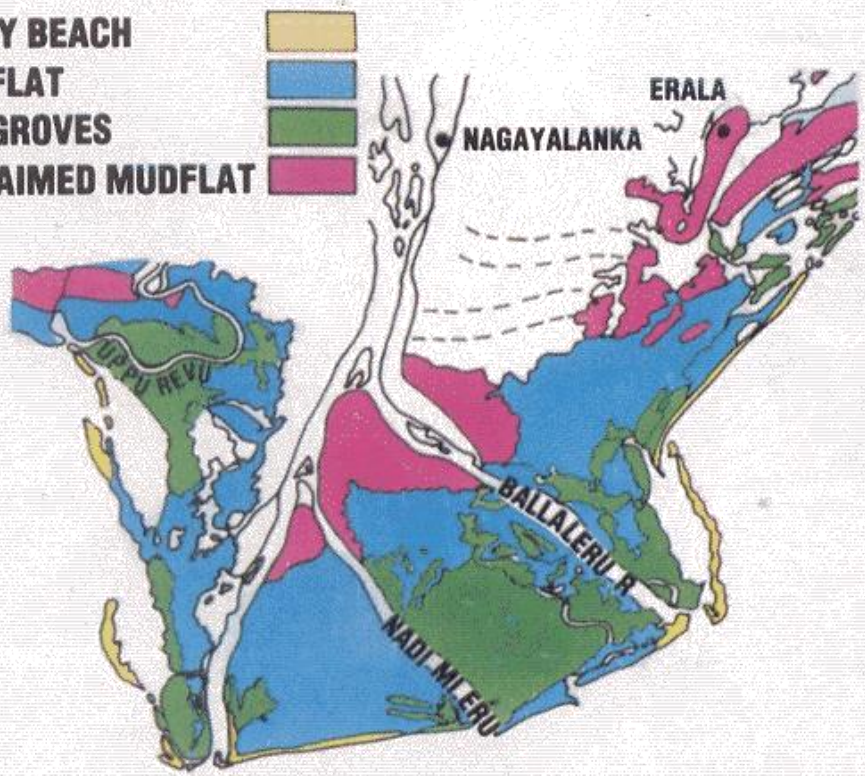




FLOOD MAPPING - JAMMU & KASHMIR (13 SEPT., 1992)

STANDING WATER WET AREA


IDENTIFICATION OF
FISHERIES POTENTIAL
USING THERMAL FEATURES
OKHA
Gujarat
PORBANDAR
VERAVAL
DIU
JAFARABAD
RANK* SYMBOL
EXCELLENT
VERY GOOD
GOOD
FAIR
POOR
*FISH CATCH
23
24
25
26
27
28
29
30
31
(TEMPERATURE DEG. C)



COASTAL WETLAND MAPPING (KRISHNA DELTA, ANDHRA PRADESH)

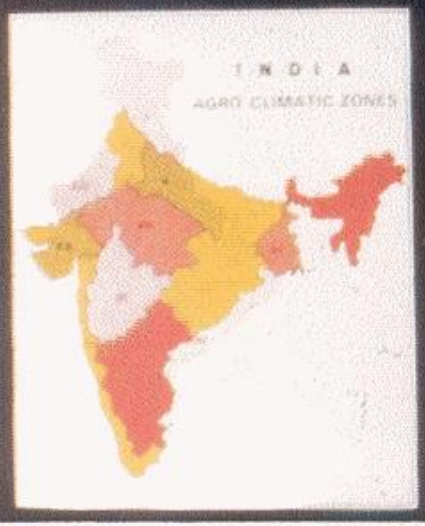
ALL INDIA AGRO CLIMATIC ZONES

LANDUSE/LAND COVER PLANNING

BASED ON IRS LISS-I DATA

1:250,000 SCALE

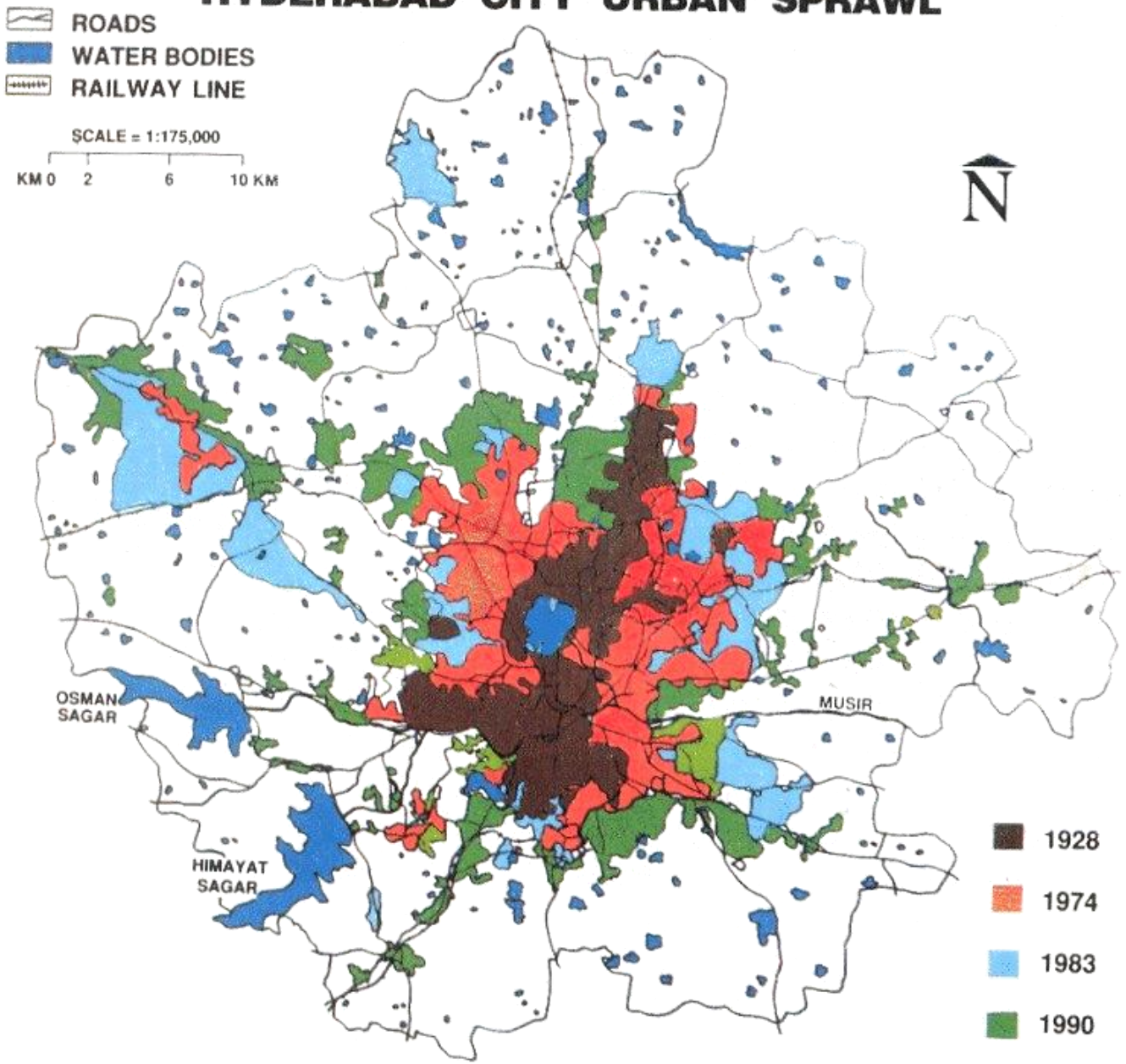
SAWAI MADHOPUR DISTRICT
RAJASTHAN

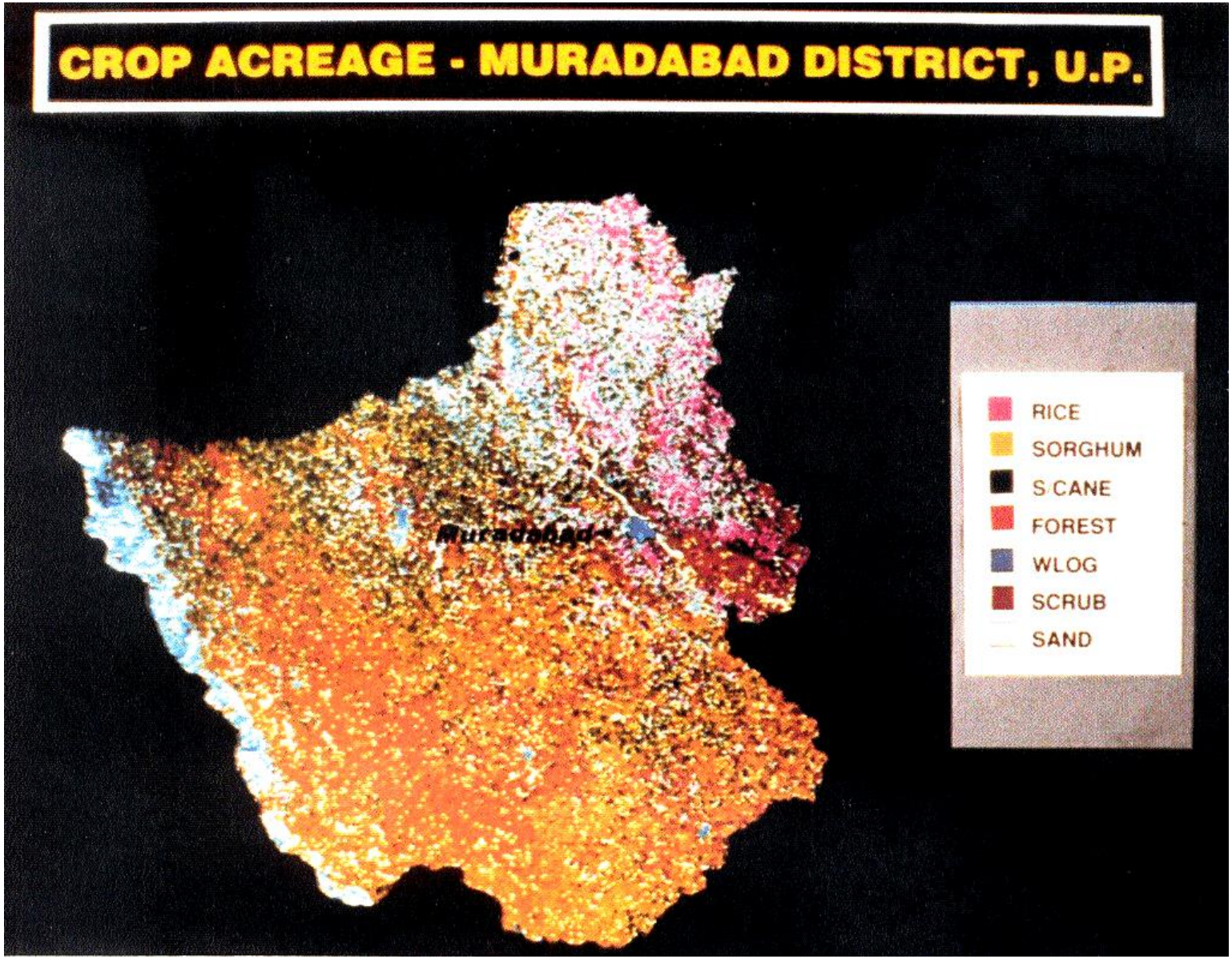


LENGEND

BUILT UP AREA	RED
AGRICULTURE	YELLOW
FOREST CLASSES	GREEN
WASTE LAND	PINK BROWN
WATER	BLUE BLACK

HYDERABAD CITY URBAN SPRAWL




CROP ACREAGE - MURADABAD DISTRICT, U.P.
Muradabad
RICE
SORGHUM
S CANE
FOREST
WLOG
SCRUB
SAND

Golden Coast Resort: A Historical Perspective

Golden Coast Resort: Morning of the Tsunami

Damage Assessments: Coastal Village (Before)

Damage Assessments: After the Tsunami

Damage Assessments: Hurricanes and Typhoons

Damage Assessments

- Emergency relief is provided by the US Army Corps of Engineers to homeowners with damaged roofs.
- Blue plastic tarps provide a temporary repair until permanent repairs can be made
- QuickBird imagery can readily identify those homes that have been repaired

Damage Assessments: Forest Fires

QuickBird Natural Color Image

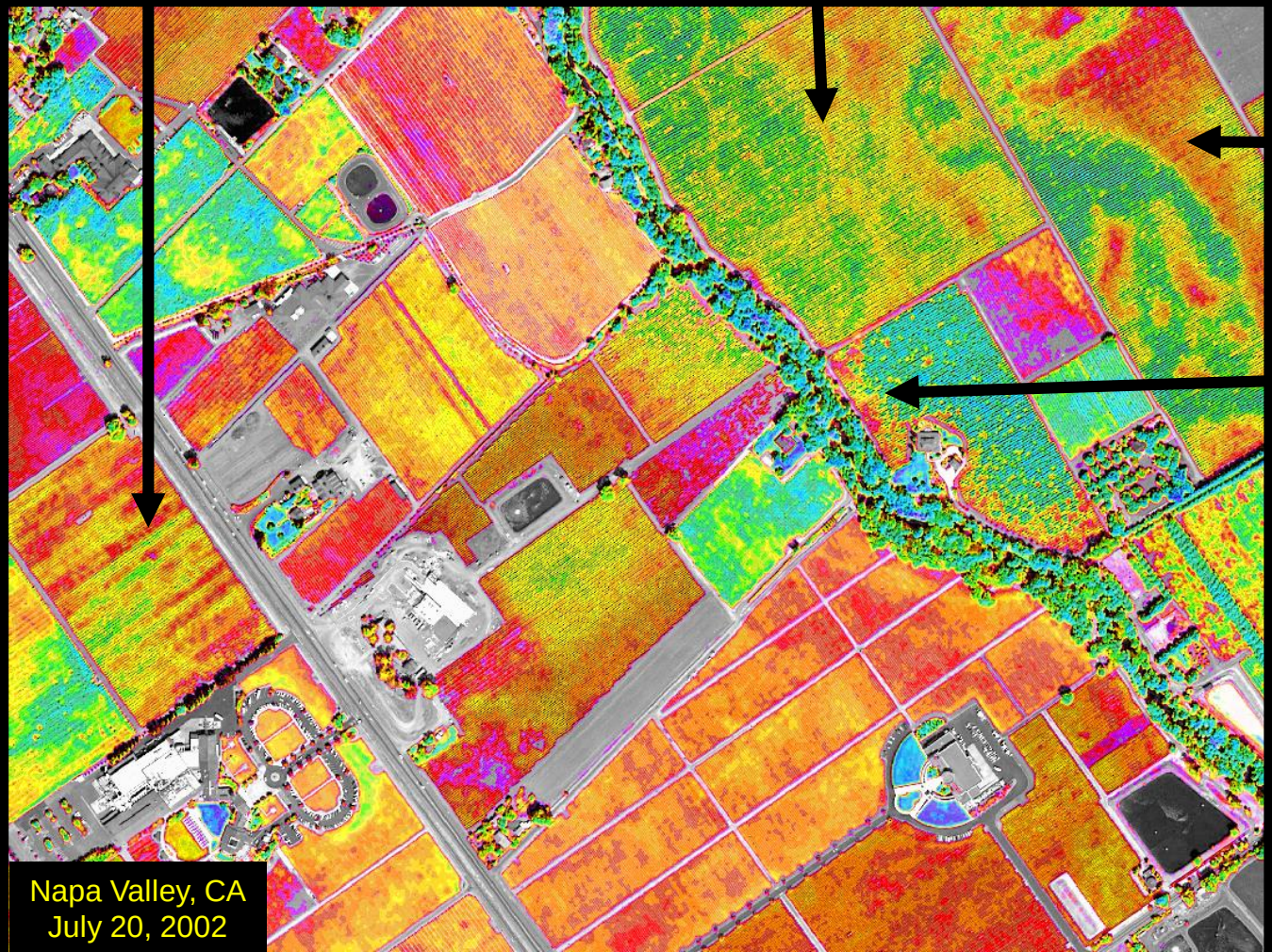
QuickBird Color Near-Infrared Image

Agriculture Applications

- **Finding New Methodologies to Solve Age-Old Problems**

Irrigation Problems
• An overview of what is really happening

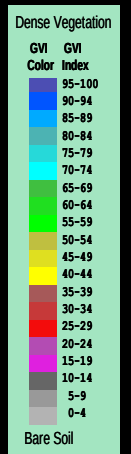
Old Field Boundaries
• The real cause of these differences



Napa Valley, CA
July 20, 2002

Soil Differences
• blame it on mother nature

Diseases
• who pays for the vines to be removed?



Blue colors show the densest canopy
Grey colors indicate bare soil