

LABORATORY – CNR ISPC

SERVICE NAME

Searching, processing and archaeological interpretation of archived aerial photos, space photos and optical satellite imagery

GENERAL DESCRIPTION

The MOLAB offers a service concerning the research, acquisition, processing and archaeological photointerpretation of aerial and satellite remote sensing data available in archives and relating to any site under study. These data represent an incredible container of direct information and a useful tool for identifying marks and anomalies that reveal the presence of not visible archaeological or paleo-environmental elements or features difficult to detect by only on-field survey; moreover, historical data can allow the identification of archaeological remains, which are no longer visible today or poorly preserved due to the rapid territorial transformations that have changed the original appearance of the historical landscape.

These are the archival remote sensing data that can be searched, processed and interpreted for archaeological purposes: historical aerial photos (1930-1990); space photos from the 1960s and 1970s (KH-4A and KH-4B Corona images, KH-7 Gambit and KH-9 Hexagon images); high-resolution optical satellite images acquired by the platforms in orbit from 1999, which provide multispectral and panchromatic data with a maximum resolution up to 30 cm. The satellite images can also be processed by applying the most recent remote sensing methodologies for archaeology and using specific software. In particular, various enhancement techniques may be applied on images, allowing to emphasize anomalies and archaeological traces related to buried ancient structures, or paleo-environmental elements, such as soil-, crop-, dump- and shadow-marks.

The service offered by MOLAB also includes the field checks and georeferencing of traces and anomalies detected by the archaeological photointerpretation.

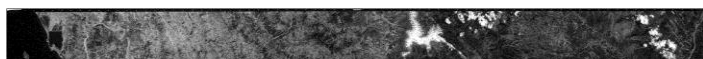
TECHNICAL DETAILS:

DATASET

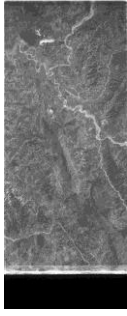
Historical aerial photos: black and white or colour images, with glass plates negatives or film negatives

Historical cosmic photos:

- Corona KH-4A and KH-4B Missions (geometric resolution: 1.8-2.7 m)



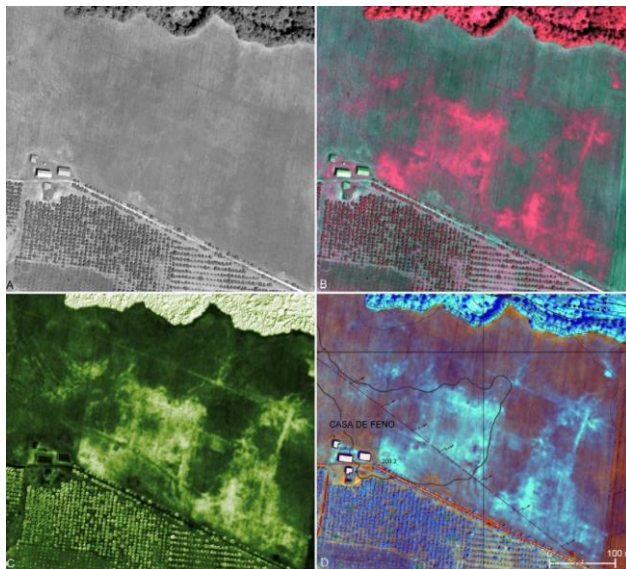
- Gambit KH-9 Missions (geometric resolution: 0.6-1.2 m)



- Hexagon KH-9 Missions (geometric resolution: 0.6-1.2 m)



Very high-resolution optical satellite images (e.g., Ikonos-2, QuickBird-2, GeoEye-1, WorldView-2, WorldView-3, WorldView-4, Pléiades1A/1B, Pléiades Neo data, etc.)



An example of processed WorldView-2 satellite image: vegetation traces relating to the presence of buried ancient structures are emphasized.

MORE INFORMATION:

M.J.F. FOWLER, *Declassified Intelligence Satellite Photographs*, in W.S. HANSON, I. OLTEAN (eds.), *Archaeology from historical aerial and satellite archives*, London 2013, pp. 47-66.

M.J.F. FOWLER, *The archaeological potential of declassified HEXAGON KH-9 panoramic camera satellite photographs*, in *AARGnews*, 53, 2016, pp. 30-36.

M. GUAITOLI, *Lo sguardo di Icaro. Le collezioni dell'Aerofototeca Nazionale per la conoscenza del territorio (catalogo della mostra)*, Roma 2003.

- I. MICCOLI, *Applicazioni GIS e di remote sensing satellitare per la conoscenza e il monitoraggio dell'area urbana di Falerii Novi e del territorio circostante*, in *Archeologia e Calcolatori* 33.2, 2022, pp. 175-195
- F. PICCARRETA, G. CERAUDO *Manuale di aerofotografia archeologica. Metodologia, tecniche e applicazioni*, Bari 2000.
- G. SCARDOZZI, *Il limes orientale tra Siria ed Iraq. Dalle fotografie aeree di Padre Antoine Poidebard e Sir Aurel Stein alle immagini satellitari "storiche" e recenti* – *Archeologia Aerea* 8, Numero monografico, Foggia 2014.
- G. SCARDOZZI, *Gli archivi digitali di fotografie aeree e immagini satellitari per l'osservazione della Terra. Stato dell'arte e prospettive per l'uso dei dataset finalizzato alla ricerca archeologica*, in P. RONZINO (a cura di), *Proceedings del Workshop L'integrazione dei dati archeologici digitali - Esperienze e prospettive in Italia 2015 Lecce, Italia, 1-2 Ottobre, 2015*, Firenze 2016, pp. 80-88.
- G. SCARDOZZI, *An introduction to satellite remote sensing in archaeology: state of art, methods and applications*, in F. BOSCHI (a cura di), *Looking to the future, caring for the past. Preventive archaeology in theory and practice. Proceedings of the 2013-2014 Erasmus IP Summer Schools in Preventive Archaeology: evaluating sites and landscapes. Methods and techniques for evaluating the archaeological value*, Bologna 2016, pp. 217-239.

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