



**NASA/ICAHM**

**Introduction to the Use of Aerial and Satellite Remote Sensing  
For Archaeological Research and Management**

**December 6, 2010**

**Science Triangle**

**Amman, Jordan**

This course will present those elements of remote sensing technology most relevant to archaeological research and site management. In doing so, it will review, using simple terms, the properties of electromagnetic radiation that govern the design of aerial and satellite remote sensors and sensor platforms, in particular the interaction of the bands of the electromagnetic spectrum used by these sensors with the atmosphere. Armed with this knowledge, students will be much better able to select appropriate images, to understand how they might be enhanced in order to maximize the probability of a favorable outcome, and to conduct productive image classifications and other analyses. Students will be introduced to the most essential remote sensing concepts, and should leave knowing what they will need to learn in order to use remote sensing technology on their research and work.

- Students should have some previous experience with image enhancement, image analysis, or geographical information system (GIS) software.
- All students must be practicing archaeologists or enrolled in a graduate archaeology program.

***Topics covered will be:***

**Enhancing the Probability of a Good Outcome**

In archaeological research and resource management, what we are looking for and why we are looking for it determine in part how we should look

## **Approaches that have worked**

*Radar Rivers, the Lost City of Ubar, and Ancient Agriculture: Lessons From a Brief History of NASA Space Archaeology*

## **What is the remote sensing process?**

Elements in the process that bear upon good results  
Introduction to image enhancement and analysis software

## **What is an image and why this is important to archaeological research and management**

Data, pixels and images

## **Digital image processing**

Image rectification and restoration  
Image Enhancement  
Image Classification  
Data Merging

## **Selection and acquisition of optimal data sets.**

## **Tuition and Registration**

Tuition is 100 Jordanian Dinar for the one day course. This includes coffee and lunch.

## **Instructors**

### **Ronald G. Blom, Ph.D.**

Ronald Blom is a geologist who has been at Caltech's Jet Propulsion Laboratory for over 30 years. He has a Ph.D. from the University of California at Santa Barbara. Currently, he is the deputy project scientist for the DESDynI (say "destiny") mission, a satellite system concept using radar and lidar instruments to study the Earth's cryosphere, ecosystems, and solid Earth processes recommended to NASA by the National Research Council. He is also the JPL program manager for Solid Earth Science and Natural Hazards research. He has been involved with archaeological projects since the Shuttle Imaging Radar A mission in 1981, which found abandoned river channels in the Sahara. During "green sahara" climate phases, these rivers hosted significant human populations as evidenced by the archaeology. Interest in helping archaeologists apply space technology lead to additional, usually unfunded, activities.

Subsequently he worked on the lost "city" of Ubar project, which was featured as a NOVA television program. This led to continued work on frankincense trade routes in Yemen. He has also worked on archaeological projects on San Clemente Island, California and Central America. With the recent climate focus, he has become interested in what archaeology can tell us about civilizations adapting to climate change. The messages from the past are not reassuring. He gave a lecture on this topic at the climate change meeting in Copenhagen last December.

### **Douglas C. Comer, Ph.D.**

Douglas Comer is Co-President of the ICOMOS International Scientific Committee on Archaeological Heritage Management (ICAHM) ([www.icomos.org/icahm/](http://www.icomos.org/icahm/)) (with Prof. dr. Willem J.H. Willems, Leiden University) and Principal of Cultural Site Research and Management, Inc. (CSRМ) ([www.culturalsite.com](http://www.culturalsite.com)). He is a recipient of National Science Foundation (NSF), Department of Defense Strategic Environmental Research and Development Program (SERDP), National Center for National Technology and Training (NCPTT), NASA, ESRI, Kaplan Fund, GeoEye, and other grants for the development of aerial and satellite remote sensing technology for use in archaeology, and has published extensively on that subject as it relates to archaeology and cultural resource management. CSRМ operates in the United States, the Middle East, Southeast Asia, Africa, South America, and Central America. Dr. Comer has been the Chief of the US National Park Service Applied Archaeology Center, a Fulbright Scholar in Cultural Resource Management, Chair of the Maryland Governors Advisory Committee on Archaeology, a Research Fellow at the Southeast Asian Center for Archaeology and the Fine Arts (SPAFA) in Bangkok and the American Center for Oriental Research (ACOR) in Amman, Chair of the Nominating Committee for the Register of Professional Archaeologists (RPA), and a Trustee for the United States Committee for the International Council of Monuments and Sites (ICOMOS). He is Conservation and Preservation section editor for the Encyclopedia of Global Archaeology.