Remote Sensing Training: Methods & Best Practices

October 13, 2016

Ana Prados, Brock Blevins, and Elizabeth Hook
Webinar Series Outline

• Week 1: Overview, October 13
  – Steps Before Conducting a Training: develop a capacity building mission statement, conduct end-user needs assessments, build a network, promote your training, and create a effective presentations

• Week 2: Onsite Training, October 20
  – Online versus onsite trainings and how to develop onsite trainings, including training levels (introductory to advanced), training structure, developing case studies and hands-on exercises, timelines, and program evaluation

• Week 3: Online Training, October 27
  – How to develop online trainings, including training levels (introductory to advanced), design of online presentations, assignments and exercises, software, and timelines.
Seven Steps to a Successful Remote Sensing Training

1. Develop a Training Mission Statement (Week 1)
2. Assess End-User Needs (Week 1)
3. Build a Network (Week 1)
4. Training Promotion (Week 1)
5. Develop Training Material (Weeks 1-3)
6. Conduct the Training (Weeks 2-3)
7. Evaluate the Training (Week 2)
Learning Objectives

• Understand the key steps needed to develop an online or onsite training

• Learn how to build a network of end-users, assess their needs, and advertise trainings

• Learn how to develop and deliver effective training materials for remote sensing applications
About ARSET
ARSET Team

GSFC: 8; ARC: 3; JPL: 2; MSFC: 1; Consultant: 1

Program Support
Ana Prados, Program Manager (GSFC)
Brock Blevins, Training Coordinator (GSFC)
David Barbado, Spanish Translator (GSFC)
Annelise Carleton-Hug, Program Evaluator (Consultant)
Elizabeth Hook, Technical Writer/Editor (GSFC)
Marines Martins, Project Support (GSFC)

Disasters & Water Resources
Amita Mehta, Disasters Lead (GSFC)
Tim Stough, Water Lead (JPL)
Erika Podest, Instructor (JPL)

Land & Wildfires
Cynthia Schmidt, Lead (ARC)
Amber Jean McCullum, Instructor (ARC)
Sherry Palacios, Instructor (ARC)

Health & Air Quality
Pawan Gupta, Air Quality Lead (GSFC)
Melanie Cook, Instructor (GSFC)
Sue Estes, Health Lead (MSFC)

Acknowledgement: We wish to thank Nancy Searby for her support
Applied Remote Sensing Training Program (ARSET)

http://arset.gsfc.nasa.gov/

• Eight year’s experience conducting online and onsite remote sensing training
• Part of NASA’s Applied Sciences Program
• Goal: increase the use of Earth Science in decision-making through training for
  o policy makers
  o environmental managers
  o other professionals in the public and private sector

Disasters  Ecoforecasting  Health & Air Quality  Water Resources  Wildfires
Applied Remote Sensing Training Program (ARSET)

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Online Webinars
- 1 hr a week, 4-6 weeks
- Live & recorded
- Includes demos on data access

Onsite Training
- Held in a computer lab for 2 - 4 days
- Focus on data access
- Locally relevant case studies

Train the Trainers
- Courses & training manuals for those interested in doing their own remote sensing trainings
### ARSET Training Levels

**Both Online & Onsite**

#### Fundamentals

- **Level 0**
  - **Webinars**
  - Assumes no prior remote sensing knowledge
  - Examples:
    - *Fundamentals of Remote Sensing*
    - *Satellites, Sensors, Data and Tools for Land Management and Wildfire Applications*

#### Basic Trainings

- **Level 1**
  - Online and Onsite Training
  - Requires basic knowledge of remote sensing
  - More general applications
  - Example:
    - *Introduction to Satellite Remote Sensing for Air Quality Applications*
    - *Using NASA Remote Sensing for Disaster Management*

#### Advanced Trainings

- **Level 2**
  - Online and Onsite Training
  - Requires basic training
  - Technically challenging topics
  - Specific applications with regional case studies
  - Example:
    - *Advanced Webinar: Creating and Using Normalized Difference Vegetation Index (NDVI) from Satellite Imagery*
ARSET Trainings
Impacts & Accomplishments

2009-2016: 7,924 combined trained

- 35 online webinars
- 44 onsite training
- 140+ countries
- 1,600+ organizations

- Disasters: 6 trainings
- Health & Air Quality: 48 trainings
- Land: 7 trainings
- Water Resources: 15 trainings
- Wildfires: 2 trainings

2009:
- 235

2010:
- 100

2011:
- 361

2012:
- 538

2013:
- 2014:
- 1014

2015:
- 2496

2016:
- 3014
ARSET’s Global Footprint

- 79 trainings
- 7,900+ participants
- 1,600+ organizations
- 140+ countries
- All 50 U.S. States

More Participants in 2015 Than All Previous Years Combined
2009 – 2015
Outline: Week 1

1. Develop a Training Mission Statement
2. Assess End-User Needs
3. Build a network
4. Promote the training
5. Develop the training material
Step 1: Develop a Training Mission Statement
Develop a Mission Statement

What is a mission statement?

• Establishes key purpose and direction of a program or project
• States intended audience and value of the program to that audience

To increase the use of remote sensing resources by environmental managers for decision-support. This is accomplished through onsite and online training that teaches participants how to access, visualize, and apply Earth science data.
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Purpose of the program: build capacity to use remote sensing resources through training
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Audience: environmental managers and policy makers
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To increase the use of remote sensing resources by environmental managers for decision-support. This is accomplished through onsite and online training that teaches participants how to access, visualize, and apply Earth science data.

Impact/Value: help improve participants’ decision making
Develop a Mission Statement

Does your capacity building program or training program have a mission statement?

If so, please type the statement into the Q&A pod followed by the name of your program and whom you target for your trainings.

If you do not currently have a capacity building program or training program, you can also submit what you intend for your mission statement to be.
Relevant Terms

• **Participant**: a person or organization who attends a remote sensing training

• **End-user**: a person or organization who uses remote sensing data and applies it to an environmental problem or question
  – May be a decision-maker and may use data to make decisions

• **Stakeholder**: a person or organization who benefits or is impacted by remote sensing data, information or decisions derived from the data
Step 2: Assess End-User Needs
Why are end-user needs important?

Assess End-User Needs

• Trainers need to understand the needs of participants

• Conduct assessments systematically

• Trainers can tailor content appropriately according to:
  – technical level of expertise of participants
  – sector of the participant (academic, non-profit, government)
  – type of environmental challenge or question participants are seeking to address
  – other factors, to be discussed later in the course
Tools for End-User Needs Assessments

• Training registration
• Interviews with key informants
• Informal forums during online trainings (such as used in this training !)
• Anonymous surveys (pre or post training)
• Working groups (e.g.)
  – End-users
  – Organizations that work with end-users
  – Remote sensing product developers
• Interactions with professional organizations
How to Conduct an End-User Needs Assessment

• **Collaborate** with stakeholders who understand the needs of the community
  – Regional organizations
  – Professional associations

• **Ask the right questions** to understand barriers and needs:
  – What is preventing you or your organization from fully using remote sensing resources?
  – What is your organization’s main type of research or environmental management activity?
  – What specific question or challenge is your organization trying to address?
  – What type of training is your organization interested in?

• **Assess** if the research question or management activity of a prospective participant can benefit from remote sensing
End-User Needs Assessments

• Why are you taking this webinar? What are you looking to learn?

• Does your program collect end-user needs? If so, how?
Step 3: Build a Network
Why build a network?

• Helps to identify stakeholders and potential collaborators for developing trainings

• Provides a list of end-users to invite to future trainings

• Provides a list of end-users and stakeholders that can be polled for conducting end-user needs assessments
  – Allows for training content to be tailored to the intended audience
  – Informs future training topics
End-User Database

Build a Network

• Enter information about participants or organizations into a database sortable by:
  – Country
  – Region
  – Sector
  – Organization
  – Training Theme Participation

• Use the database to identify gaps
  – Geographical regions
  – Sector
  – Organizations
Step 4:
Training Promotion
Identify Potential Participants

Training Promotion

Examine again your mission statement and the results of your end-user needs assessments to identify appropriate potential organizations, sectors, or regions for participation in your training activity.

ARSET promotes trainings to the following:

- Applied science professionals and decision-makers
- Organizations with demonstrated environmental need
- Previously unreached organizations
- A sector or geographic region with traditionally low engagement
- Organizations with high potential for future collaboration
- Stakeholders with unique knowledge of their community’s decision support system (DSS)
Means to Promote a Training

• Email
  – Listservs
• Existing websites, portals, & groups from stakeholders or other organizations
• Networking
• Social Media
Example: ARSET’s Process

Promote Trainings

- Email
- Listserv (1,260)
- Existing websites, portals and groups from stakeholder or other organizations
  - FedCenter, eoPortal, GWP, US Water Partnership, etc.
- Targeted outreach strategy for collaborative trainings
- Outreach Database (2,700+)
- Twitter (~1,900)
Example: ARSET Twitter @NASAARSET

Advertise & Promote Trainings

• Have a clear idea of your account’s purpose
• Post & Engage Regularly
• Maintain a schedule to post tweets, with retweets from other organizations filling in the gaps
• During trainings:
  – Have pre-planned tweets
  – Be prepared to supplement if there’s interesting information or conversation
  – Pay attention to any replies or questions in real time
• In addition to posting regularly, keep track of the mentions and conversations happening about your program
Training Promotion Methods

• How does your program advertise trainings? What works well for you?

• Are there any other tools for training promotion you would like to learn about?
Step 5: Develop Training Material
How to Build Effective Presentations

Develop Training Material

• Be aware of the context for your presentation – what questions do the training participants face?

• The pace of the presentation depends on the audience
  – Speak slower (at least 30%) if your audience has little to no experience with your subject matter

• Speak clearly and use a microphone if needed

• Define acronyms and terms early in the presentation

• Practice, practice, practice
Developing Slides
Develop Training Material

Title

Point

ARSET
Applied Remote Sensing Training
Effective Presentations Should…

• be for the audience
• keep the presenter on track and focused
• reinforce ideas – not repeat them
Tips

Effective Slides

• Be consistent
• Pay attention to detail
• Keep it simple
**Tips**

**Effective Slides**

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**NDVI Example**

- This is a Landsat NDVI image of the Panama Canal watershed
- The darker green the area, the higher the NDVI value, and the more green vegetation is present
- This image was acquired in March 2000 during Panama’s annual dry season
Tips

Effective Slides

• Be consistent
• Pay attention to detail
• Keep it simple

• Text format
  – the same font
  – the same font size
  – the same color
  – in the same place on a slide

• Images
  – aligned properly
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• Points on your slide
  – sentences or phrases
  – capitalization
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Effective Slides

• Be consistent
• Pay attention to detail
• Keep it simple

• Balance between writing everything you want to say and providing highlights
• One idea per slide
• You might have too much content if:
  – you feel you need to use many bold colors to draw attention
  – you have to shrink your text
  – your slide is a solid wall of text
Example Slide
Spatial and Temporal Resolution Depends on the satellite’s orbit configuration and sensor design.

- **Spatial Resolution** is decided by its pixel size - pixel is the smallest unit measured by a sensor.
  - Refers to the detail discernable in an image by a pixel.
- **Temporal Resolution** is how frequently a satellite observes the same area of the Earth.
  - The time it takes for a satellite to complete one orbit cycle; also called “revisit time.”
  - Depends on satellite/sensor capabilities, swath overlap, and latitude.

### Spatial Resolution

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Next Week: Onsite Trainings

• Online vs. Onsite Trainings
• How to Develop Onsite Trainings
  – Training Levels
  – Structure
  – Developing Case Studies & Hands-on Exercises
  – Timelines
  – Program Evaluation