



ARSET

Applied Remote Sensing Training

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

 @NASAARSET

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
 - policy makers
 - environmental managers
 - other professionals in the public and private sector



Disasters



Ecoforecasting



Health & Air Quality



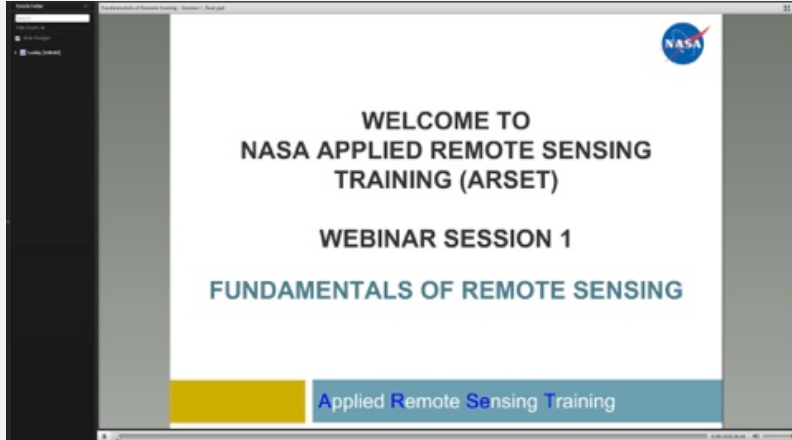
Water Resources



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

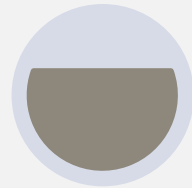
Both Online & Onsite



Fundamentals

Level 0

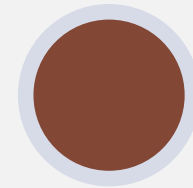
- Webinars
- Assumes no prior remote sensing knowledge
- Examples:
 - *Fundamentals of Remote Sensing*
 - *Satellites, Sensors, Data and Tools for Land Management and Wildfire Applications*



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

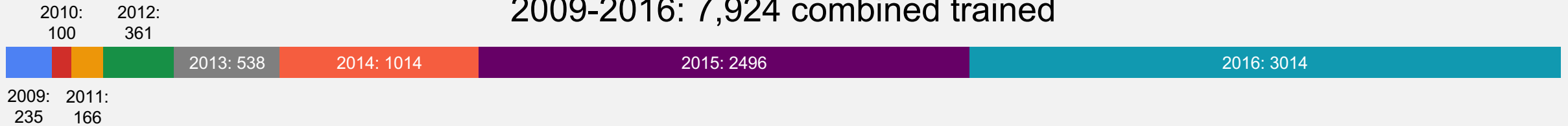
Level 2

- 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

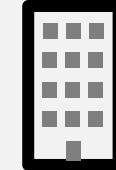


 35 online webinars

 44 onsite training



140+ countries



1,600+ organizations



Disasters
6 trainings



Health & Air Quality
48 trainings



Land
7 trainings



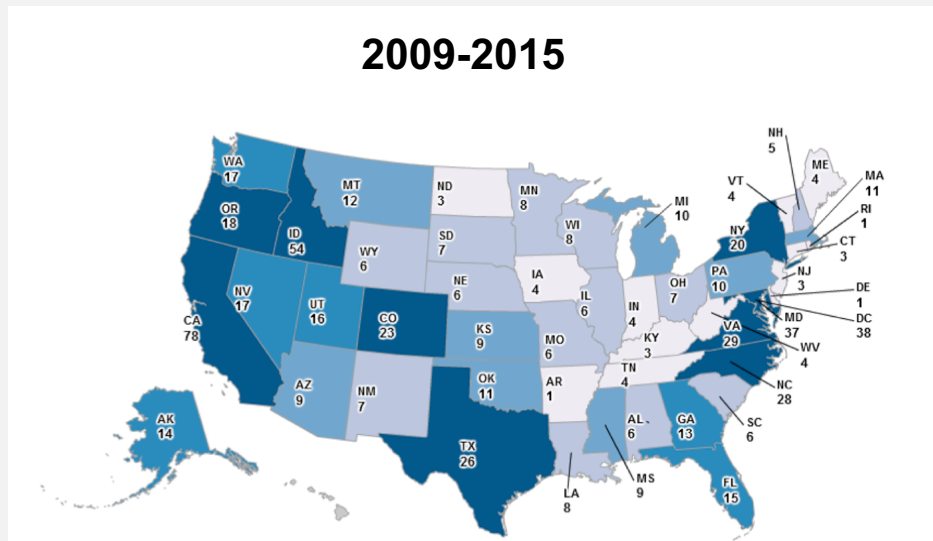
Water Resources
15 trainings



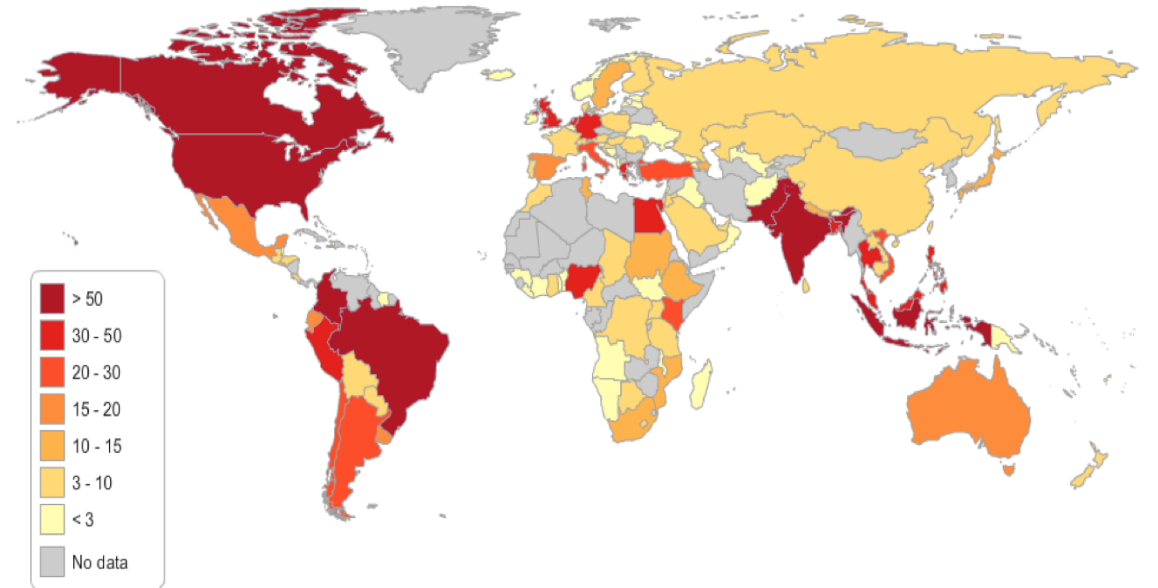
Wildfires
2 trainings

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

An aerial satellite view of a coastal region, likely the Gulf of Mexico, showing land, water, and some red markers on the land. A semi-transparent grey box is overlaid on the image, containing the text.

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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*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.*

Audience: environmental managers and policy makers

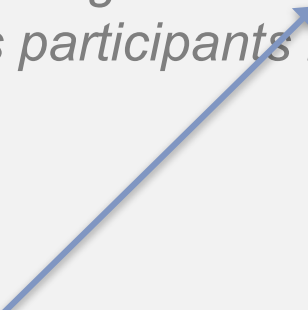
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*To increase the use of remote sensing resources by environmental managers for **decision-support**. This is accomplished through onsite and online training that teaches participants how to access, visualize, and apply Earth science data.*

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

An aerial satellite image of a coastal region, likely a delta or estuary, showing a mix of brownish land, greenish water, and white sediment. A semi-transparent grey rectangular box is overlaid on the left side of the image, containing the text 'Step 2: Assess End-User Needs'. A horizontal black line is positioned below the text.

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

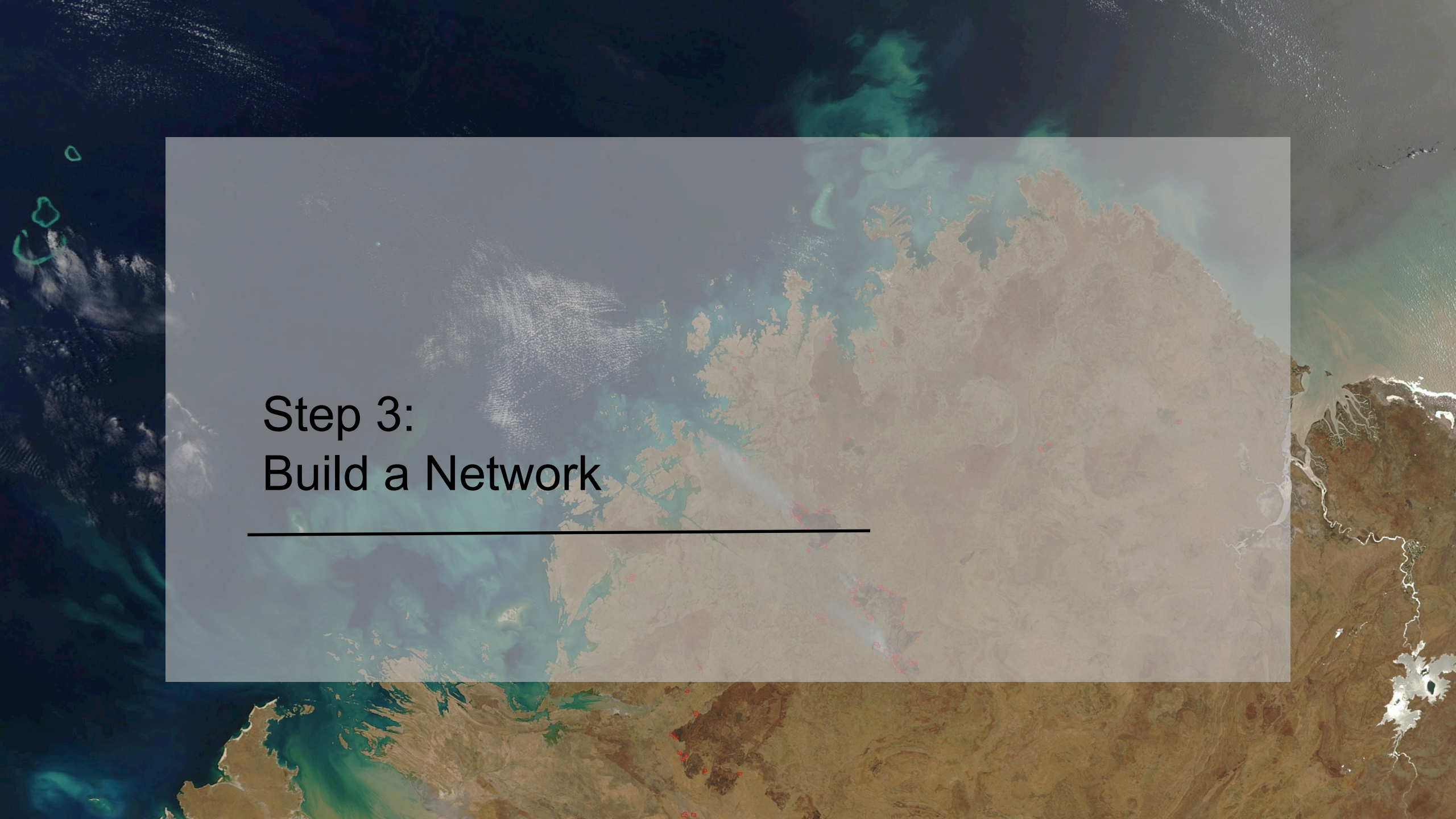
- Training registration
- Interviews with key informants
- Informal forums during online trainings (such as used in this training !)
- Anonymous surveys (pre or post training)
- Working groups (e.g.)
 - End-users
 - Organizations that work with end-users
 - Remote sensing product developers
- Interactions 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?

An aerial satellite view of a coastal region, likely a delta or estuary, showing a mix of brownish land, greenish water, and white sediment. A semi-transparent grey rectangular box is overlaid on the left side of the image, containing the text 'Step 3: Build a Network'. Below the text is a horizontal black line.

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

An aerial satellite image of a coastal area, likely a bay or estuary, showing a mix of brownish land and blue-green water. A semi-transparent grey rectangular box is overlaid on the left side of the image, containing the text 'Step 4: Training Promotion'. Below the text is a solid black horizontal line. The background image shows a coastline with some red and blue markers scattered across the land and water areas.

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)

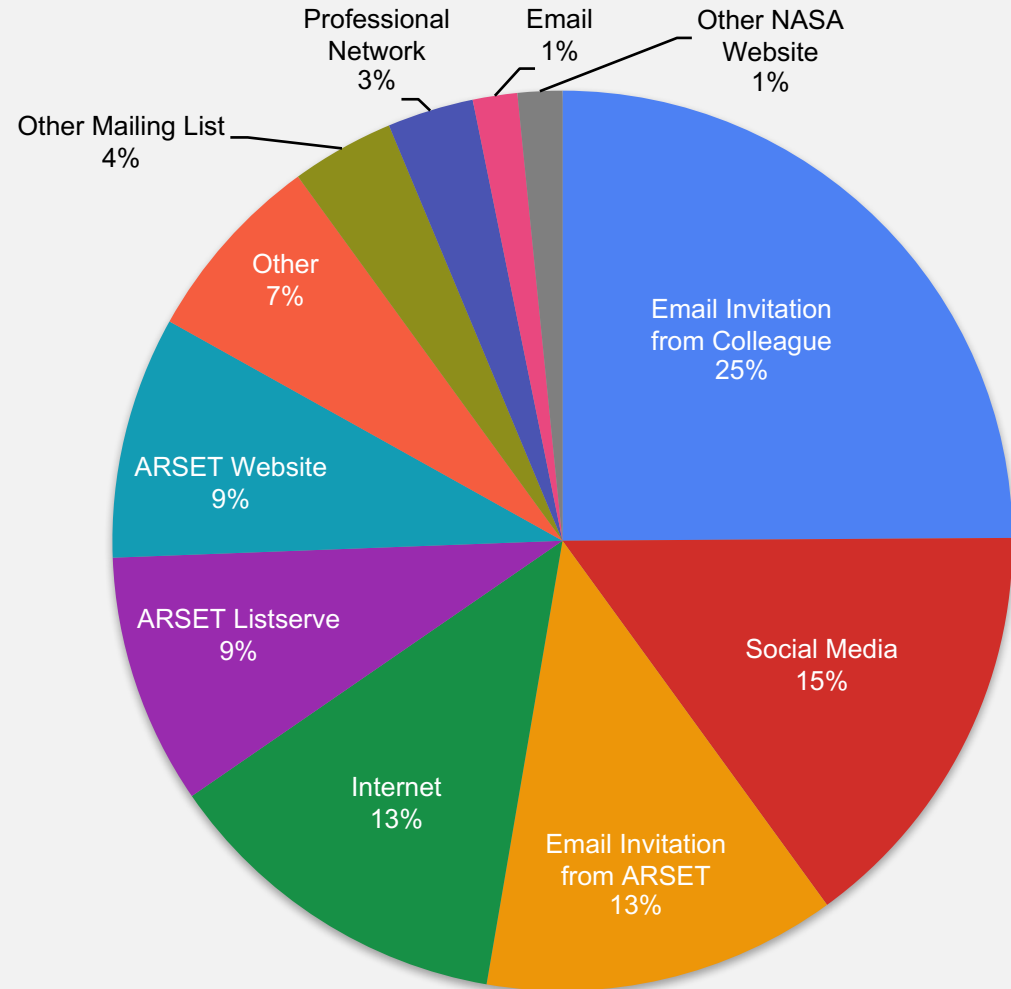
Means to Promote a Training

- 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?

An aerial satellite image of a coastal region, likely the Gulf of Mexico, showing a mix of land and water. The land is brownish-tan, and the water is dark blue. A semi-transparent white rectangular box is overlaid on the image, containing text. The text is in a bold, black, sans-serif font. A horizontal line is positioned below the text.

**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 _____

- _____
- _____
- _____



ARSET
Applied Remote Sensing Training



Point



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

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Effective Slides

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National Aeronautics and Space Administration 

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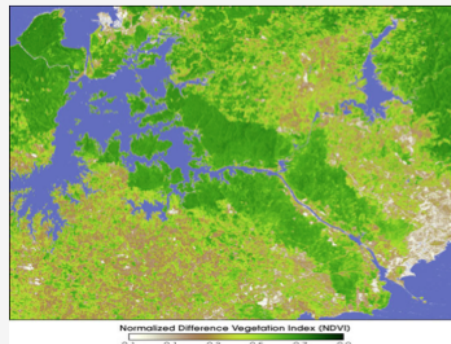
Introduction to Remote Sensing

IUCN World Conservation Congress

CONSERVATION INTERNATIONAL 


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



National Aeronautics and Space Administration

Applied Remote Sensing Training Program 62



NDVI and Phenology

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
 - correct ratio
 - credit images
- Points on your slide
 - sentences or phrases
 - capitalization
 - verb tenses
 - use the same bullets

Tips

Effective Slides

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Tips

Effective Slides

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

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

An aerial satellite image of a coastal region, likely a bay or estuary. The water is dark blue, and the land is a mix of brown and tan, indicating a mix of vegetation and bare earth. There are several small red markers scattered across the land area. A semi-transparent grey rectangular box is overlaid on the image, containing the text "Example Slide" and a horizontal line below it.

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

Sensor	Spatial Resolution
Digital Globe (and others)	<1 -4 m
Landsat	30 m
MODIS	250m – 1 km
Global Precipitation Mission (GPM) Dual Frequency Radar	5 km

Sensor	Revisit Time
Landsat	16 days
MODIS	2 days
Commercial (OrbView)	1-2 days

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18 pt

20 pt

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24 pt

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An aerial satellite image of a coastal region, likely a delta or estuary, showing intricate water channels and sediment patterns. The water is a mix of dark blue and light green, indicating varying depths and sediment concentrations. The land is a mix of brown and tan, showing a complex network of channels and islands. A semi-transparent white rectangular box is overlaid on the left side of the image, containing the word "Summary" in a black serif font. Below the text is a solid black horizontal line.

Summary

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)

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