

Below is the script written out by the trainers for this week's session. It is not a word-for-word transcript of the recorded training, but will still give you all the highlights and information covered.

[Slide 1] Title Slide

Welcome to week 3 of Remote Sensing Training: Methods & Best Practices hosted by NASA's Applied Remote Sensing Training program - also known as ARSET. This week's presentation and discussions will be on online trainings. I'm Elizabeth Hook ARSET's Communications & Technical Writer/Editor, and today's other presenter is Brock Blevins, ARSET's Training Coordinator.

[Slide 2] Webinar Series Outline

This is the last week of this 3-part training series. Week 1 provided an overview of methods & best practices for trainings, including getting started with mission statements, figuring out how your trainings can meet end-user needs and how you can assess those needs, how to promote your trainings, and how to put together good presentations.

Week 2 focused on onsite trainings, looking at how to develop them, how to structure an in-person remote sensing training, how to develop case studies and hands-on exercises, and program evaluation.

If you missed a week or want to review, the recordings for both weeks are posted on the ARSET website. We have also made available the scripts the trainers used to present the trainings. They are not word-for-word transcripts - sometimes we go off-script - but they are relatively close.

This week we'll discuss online trainings, training levels, and how to structure an online training. We'll also go into some of the considerations when choosing a software, and the timeline of producing an online training.

[Slide 3] Learning Objectives

Our goal is that after this week, you'll be able to understand the key components needed for developing onsite or online trainings, you'll be able to conduct outreach to promote your trainings, and you'll be able to develop and deliver effective presentations on remote sensing topics and applications.

[Slide 4] Seven Steps to a Successful Remote Sensing Training

We've been presenting these methods and best practices within a framework of 7 steps to a successful remote sensing training. We covered the first 5 steps in week 1 and steps 5-7 for onsite trainings last week. This week we're going to go into steps 5-7: developing, conducting, and evaluating online trainings.

[Slide 5] Week 3 Outline

To do that, we'll begin with an overview of what an online training is, different levels, and the structure of online trainings. We'll go through some considerations for software to host online trainings, an outline of ARSET's timeline for producing online trainings and all the materials & deliverables that entails, and we'll close with a course summary. There will be a time at the end of this week for a question & answer session.

[Slide 6] Transition Slide: Online Trainings

To get started, let's review again the differences between onsite and online trainings.

[Slide 7] Online vs. Onsite Trainings

There are many forms on online and onsite trainings. Last week we covered onsite, in-person trainings in more depth. ARSET has the most experience with the type of onsite training held in a computer laboratory over 2-7 consecutive days. In these trainings, information is presented using a mixture of lectures and hands-on activities.

ARSET also offers online trainings, like the one you're taking now. We typically offer live versions over the internet, with the recordings available later for on-demand viewing. Our online webinars are usually offered in series, with each session held once a week for 3-5 weeks. Each session is typically 60-90 minutes, and includes some combination of presentations, demonstrations, interactive sections, exercises, and homework.

[Slide 8] Criteria for Choosing Online vs. Onsite Trainings

When you're deciding between online & onsite trainings, there are several things to consider. Since online trainings are available on the internet, there's no cost associated for travel, either for the trainers or the attendees. One potential cost for online trainings is the cost of the software you use to broadcast the training.

Another consideration is the number of staff required. This is highly variable for the types of trainings you're doing, the number of attendees you're engaging, and many other things. For online trainings, ARSET makes sure that there are at least 2 hosts at any given time. If there's a technical glitch, it means, at minimum someone else will still be in control. Like today, it also means that as I'm presenting, if someone asks a question, Brock can keep an eye on things. And when he's presenting, I can do the same. But if it's a small, pre-recorded training, you might be able to get away with one host in an online training.

In terms of audience size, online trainings can potentially have a much wider reach than onsite, in-person trainings. This room, for instance, can hold up to 500 people. That's far more than we would be able to train in person. But it means there's less individual, in-depth interactions with the attendees. So if you're looking for an intensive, highly interactive course, onsite might be better than online.

Because of this loss of one-on-one interactivity between trainers and attendees, ARSET has also traditionally used online trainings for more introductory level trainings - basics of remote sensing, introduction to remote sensing for water resources, etc. It's only been in the last year that

we've been exploring ways to do advanced, in-depth online trainings. But very complex trainings - which can be successfully done on a small scale at an in-person training - may not transfer well into an online format.

[Slide 9] What is an online training?

If you've looked at the criteria, and decided to go with online, what exactly are we talking about? Online trainings are delivered over the internet. They can be live, on-demand, or a mixture of the two. The biggest advantage of online trainings is that attendees can participate wherever they are in the world, as long as they have internet access.

These online trainings can take several different forms. To name a few, they can be held hourly over the course of several weeks, they can mimic an in-person training and be several hours over a few days, or they can be self-paced where the attendees walk themselves through training material. Online trainings can reach different numbers of people, and can include a number of different ways to present information - from presentations to demonstrations of data access to question & answer sessions.

[Slide 10] Gradual Learning Process

At ARSET, we have participants with a wide range of backgrounds access our trainings. That means some people come with no experience in remote sensing, and some come very familiar with remote sensing data. Because of this variety, we take a 'gradual learning approach.' We have found it very useful to leverage online webinars as a way to let our courses build on each other, offering trainings for various levels of expertise.

If you have no experience with remote sensing, you can take a 'fundamentals of remote sensing' training. It will cover the vocabulary and basic skills necessary for taking basic or advanced trainings. ARSET reached a point where we realized the material covered in this training was being used over and over again, so we recorded a general, fundamentals webinar that people can view on-demand.

We're also working on making fundamentals webinars for general focus areas - like land - to cover the satellites and sensors that we regularly cover in that area's trainings.

Once a participant is familiar with the vocabulary and the satellites and sensors, they can move on to basic trainings, which go into broader applications. For instance, our 'Introduction to Remote Sensing for Conservation Management' training covered examples of how remote sensing can be used for various conservation topics.

But if an attendee wants to dig into *how* to do a specific application, we also provide advanced trainings. These trainings include more intensive exercises and trainings on specific applications. For example, if you had taken our Introduction to Conservation Management webinar, you could then take ARSET's Advanced Webinar on Creating & Using the Normalized Difference Vegetation Index from Satellite Imagery to learn a more specialized application.

Now that you have that general overview of online trainings and the ways ARSET lets them build on each other, Brock is going to take over and talk more about the details of structuring an online training.

[Slide 11] Transition Slide: Training Structure (Speaker, Brock Blevins)
Thank you Elizabeth. In these following sections we will walk through the details of online trainings, methods of delivery, and timelines that we at ARSET have found to ensure a successful training experience.

After each topic we will once again open up the forums and I look forward to hearing from you and how your programs address these topics.

[Slide 12] Considerations for Online Training

Before we move on to the variety of ways an online training can be structured, we wanted to cover a couple items one may consider.

Many times it will be useful to partner with others to provide in depth knowledge on certain topics that those in your program may not possess. For instance, we train on many data products coming from new NASA missions and satellites so it is beneficial to have guest speakers who help develop those products since they have a more intimate knowledge of the subject.

Working with the end user community or stakeholders will go a long way to better know what is actually needed in the field, or the real world applications of the remote sensing data. This can be done through pre-training surveys or have those stakeholders help to design the training agenda.

Since the point of the training being offered online is to enable a larger audience, consider offering multiple options to attend throughout the day or week in order to accommodate many time zones. We try to offer 2 identical sessions for our online trainings to address this. You may have noticed when you registered, you had the option of session A or B, held several hours apart so hopefully you could find the session that best fit into your schedule.

Providing transcripts or offering materials in more than one language will be another method to be more inclusive with your audience.

Also, how many trainers will be needed? If the training is self-paced and available on demand, perhaps one person is only needed. Other variations of an online training may require more staff if it involves more trainer to participant interactions. When ARSET hosts webinars, we make sure that there are at least 2 people on at any given time that can take over hosting. If there's a technical glitch, this means someone can still be in control. It also means that as I'm presenting, if someone asks a question, the other host can keep an eye on things and the other way around.

[Slide 13] Types of Online Training

You may have noticed there are many variations in training type. The types can be broken down into 3 key elements. One is the length of the training. Some can be as short as 15 minutes to briefly introduce a topic or to cover a very specific procedure. Others can span days or weeks. This webinar series, for example, is about 3-4 hours in total, but spread out over 3 weeks. Another key element is the timing, so you can present the training materials in real time, live to your participants. Others can be on demand, preset or a pre-recorded training.

A final distinguishing characteristic will be how that content is shared. The online training ARSET typically conducts would fall into this first category, Sharing Slides or demonstrations with an audio presentation, which can be live or on demand.

Many online trainings of self-paced variety, such as the on demand type. These are usually provided through a Learning Management System such as Storyline. These can also be termed asynchronous trainings because all the participants have the freedom to login on their own time to complete the training materials.

There are also recorded or live broadcast of a classroom where an onsite training is being conducted.

And of course there are combinations of these or more. The point is, there are many types.

[Slide 14] Question

So that brings us to our first forum. We would like to hear from you and ask you to share to the group the kind of online trainings your program conducts. What format of online trainings do you present? (e.g.)

- Sharing slides with audio presentation
- Self-paced online module
- Broadcast a classroom presentation
- Other?

Are they presented through a Learning Management System, on demand or self-paced? Do the participants and trainers convene live and have the ability to interact? Please include details such as: How long are your trainings? An entire day, a 6 hour block of time, weekly sessions? I will pause here and let you type in your responses.

[Slide 15] ARSET Agenda Example

This slide shows what we at ARSET have traditionally done as far as structuring our online trainings and here is a sample agenda that illustrates that structure. As I mentioned, our online trainings, or webinars, are offered in a series of 60-90 minute long sessions presented live for three to five consecutive weeks. The last 15 minutes or more of each webinar is dedicated to a 'question and answer' period. Many webinars have 2 sessions at different times of the day to accommodate various time zones, and to help augment overall participation.

In general, the first week we introduce the training, the topic, and the many applications of the remote sensing data products. In the following weeks we go deeper into the details of the different data types, data access options, tools, or methods relating to the larger webinar topic in each week.

For example, for those who attended the Water Resources or Advanced NDVI webinar series, these agendas may look familiar. After we introduced the satellite missions and models related to the training in week 1, the following weekly sessions addressed sub topics within the topic. Such as with the water resources series. Each week covered different elements of the water cycle, its data and access, then in the final week of the series we demonstrate methods to bring them all together and estimate a regional water budget.

We did this as well with an advanced webinar series, such as this training , Creating and Using Normalized Difference Vegetation Index (NDVI) from Satellite Imagery. After giving an overview of NDVI and an introduction to GIS, the following weeks built off that knowledge, showed the acquisition of Landsat imagery, and deriving NDVI using a GIS, also doing the same with

MODIS NDVI but also and how to create a time series from, and finally how to create a MODIS NDVI anomaly map. Each week with its own focus under the broader topic of NDVI.

[Slide 16] Training Components

An online training content is similar to that of an in person, onsite training. It can be composed of mixture of lectures, demonstrations. Online trainings can include homework, and exercises. If interactive, they can include time for question and answer periods.

And just as with face to face trainings, it will be useful to have some method to evaluate the training or training experience.

For each component, we will cover some tips we have found to be useful. When we open up the forum, we will ask those online to share your thoughts on these components, so keep that in mind as we go through these.

[Slide 17] Lecture

The lecture portion of an online training. Since the online training has the potential to be global, it will be good to keep your audience in mind when putting together and delivering your lectures. This mean speaking slower and annunciating your words so that those Try to use language that is neutral and avoid idioms so you are not using phrases and words that are only used in certain regions. Don't use offensive phrases or words. Also try to define acronyms and technical jargon. This is important since they may not have an opportunity to ask you to repeat if spoken too quickly.

Since a lecture or presentation can at times be lengthy or especially since this is being presented online, your audience will be sitting in front of their computer. It is easy to be distracted with emails or other work, so find ways to keep the participant engaged. After certain topics, give a quiz or poll to be sure they were following along and comprehending what you just

covered. Allow for time to let participants interact with each other in a forum. This can break up any monotony that can exist in a long lecture.

It's a good strategy to work in case studies to the lecture. I think the audience naturally relates to case studies and this provides them some context on how to apply the data/tool/method to whatever they are interested in.

[Slide 18] Demonstrations

That brings us to Demonstrations, or “demos”. The purpose of demonstrations is to show the sequence of actions or the click by click steps designed to show participants how to navigate these webtools and portals. It may not be intuitive to someone how to use them if it is their first time so it is extremely helpful to demonstrate the features of a portal or tool. We like to show the many different options that can be enabled within a webtool, and different visualization techniques. Data portal navigation for data access are some of the most instructive demonstrations, and can include how to download, showing the data format options, and if want to go a step further, how to import into a GIS.

More advanced demos can show the analysis and application of that data, the step by step instructions in offline exercises, or examples of running code to perform an analysis of that data.

We walk participants through guided exercises of online tools or portals we have demonstrated so they can navigate and process data themselves. This is more about getting the participants to “do it themselves” rather than just understanding the lecture.

These demonstrations can be a live screen share of a site or it can be pre-recorded. One tip I would like to add is even if you may perform a live demo of a tool, it will be useful to have a recording made ahead of time. That way if all the participants go to your online tool or portal and it slows down the site you will have a means to present without the demonstration itself being

affected. This also helps if the site happens to be under maintenance that day.

[Slide 19] Homework Assignments

Homework and assignments are a good way to evaluate the participants comprehension of the training material and reinforce the training content.

Instructors must strike a balance between adequately testing knowledge and ease of evaluating the assignments and effective assignments include a mix of multiple choice and short-answer questions. Multiple choice or true or false questions are the easiest to grade but limit the ability of a trainer to test depth of understanding. Short answer questions require a bit more time to check for accuracy since you may have to read each response but they do provide better insight to the participant's comprehension. You may consider a way to incentivize assignment completion. To that end, ARSET requires participants to submit homework in order to receive a 'certificate of completion' for the training.

Then there is the method you use to collect the homework. We use Google Forms to collect homework because it is administered online to which helps trainers easily track completion. In Google Forms you can even indicate the correct answers to multiple choice questions so once submitted the participant can check their score.

[Slide 20] Question & Answer Session

Question and answer, or Q&A, sessions provide a time when participants can ask follow up question to content that was delivered in a lecture or ask for clarification on various subjects. There are many ways to do this, whether they are opened up throughout the training or at the very end. We have found that a clear and structured question and answer session is one in which the questions are repeated or reframed by the trainer before answering. If there are multiple trainers online addressing questions from participants, it may be helpful to designate one trainer to take the lead, or at

least be familiar with each other so the trainer most knowledgeable on the question's subject.

These sessions also provide an opportunity for those participants online to network among themselves. For instance, the first text I put up in a Q&A session reads "Please feel free to type your questions here. Additionally, you can type your name, location, organization, and email address to connect with your fellow remote sensing practitioners".

And finally, this is a prime opportunity for trainers to ask the participants questions and a can serve as an additional end user needs assessment. These can be ad hoc questions on the subjects presented that week, or you can ask for feedback on their experiences with certain portal or tools if they have used them before. Such as "How user-friendly did you find Giovanni? Or What services would you like available to make data access and usage easier?

You can also begin discussions with the audience on future topics they would like to see in a training and to get an idea of how they wish to apply the remote sensing data.

[Slide 21] Program Evaluation

We talked about program evaluation in week 2 for onsite trainings and this applies to online trainings too. You still want to get feedback.

So once again, the goal of program evaluation is to:

- Assess progress toward meeting learning objective – how well your program is doing?
- Assess the impact of the training – are participants making use of what they learn in their jobs or academic study and how?
- Altogether to provide an ongoing means of improving the program

Here are the various tools used to conduct the evaluations,

- Surveys
- Interviews

- Focus groups

[Slide 22] Program Evaluation

Some additional things to keep in mind when doing this in an online setting would be to provide some time at the end of the training for the participants to begin the survey. Even if you merely post the url to Survey Monkey (or your chosen online survey form) and ask them to click and open it, the chances they will complete it goes up.

You all may have your own ways to send reminders to fill out the survey, but we at ARSET send them one week afterwards, and again a week after that.

If you want to evaluate the impact of your trainings, a follow up 6 month survey may be needed, after some time has passed and they have had time to really work with and apply the data.

These results can also be used to show the impact of your program to justify continued support for your capacity building program.

[Slide 23] Question

What about the components we mentioned (listed below) have worked or not worked well for you?

Please provide the component you are referring to in your reply.

[Slide 24] Transition Slide: Software

In this next section, we are going to talk about the software needed to conduct an online training. The software provides a method to present informative and instructional materials virtually as if participants were in a seminar room viewing the presentations. A variety of software options offer a wide range of capabilities and we won't present on specific software, since there are many to choose from, each with their own advantages and disadvantages. However, in the forum we will be asking those online to share the software they have found to be useful and why.

But here we just wanted to speak to the different features they can provide.

[Slide 25] Considerations

Here we have considerations when using software to present your online trainings.

We have found the ones to be most useful are those that provide the ability to broadcast the presenter's slides, audio, and/or video. They provide sufficient capacity into each seminar room (i.e. the number participants that log in at any one time), a method to manage and track participation, and the ability to interact with participants throughout the training process.

When using large webinar rooms, we have found it useful to employ a software that includes the ability to manage registrations. This allows trainers to screen the participants that best fit the training learning objectives. The registration information can also be used to adapt the training content to best meet the needs of participants, and inform the development of future trainings.

The ability to manage the webinar sessions with a means to send reminders for the training as it approaches is useful, although an email client can do this too. But we find it nice to have all this in one place, within the software.

Software that features ways to keep participants engaged and enable interactions. These include 1) chat boxes so participants can interact with each other and with the trainers or polls or quizzes that trainers can send instantly to participants during the webinar session.

A landline option is a useful feature if audible interaction among the participants and trainers is desired.

But the ability to automatically mute microphones is important. Background noise or feedback noise is sometimes unavoidable

Additionally, the ability to record the training is a good feature. Participants' quality of internet connection varies greatly, and for some participants, poor internet quality will lead to technical difficulties. Instead of watching the live webinars, participants experiencing technical difficulties can opt for viewing the recorded webinars 'on demand.'

[Slide 26] Question

Please indicate in your reply whether it is on demand or live?

Poll: live, on demand

ARSET currently uses Adobe Connect software to broadcast the presenter's slides, audio, and video. There are two webinar room sizes: 200 and 500 individuals. The Adobe Connect software can be used to manage registration, send reminders, and email attendees a link to access the webinar.

[Slide 27] Transition Slide: Timelines & Deliverables

In this following section, we will talk about the timelines and deliverables. This will be similar to the timeline for an onsite, in-person training with some slight alterations. Certainly given the many differences that can exist from one program to another, these timelines can adjust but what in the next few slides are what we at ARSET have found to work in order to ensure a smooth process, on time delivery of training materials, and addresses the nuances associated with presenting a training online.

[Slide 28] Timelines & Deliverables (4-6 months - 1 month prior)

Assuming you have already determined the topic of the training based off the needs of your remote sensing end user community. we have found that 4 to 6 months allows for enough time to sufficiently plan and produce an online training and this begins with a preliminary agenda. This 4- 6 month time frame allows time to gather interest from potential participants. Sending invitations and presentation guidelines to any guest speakers

should begin early to clearly communicate the expected timeline of materials such as presentation slides. Together you can determine if there are certain regionally specific case studies you plan to present.

But by 3 months it will be beneficial to have the agenda finalized because as you promote through your listserve, email, or social media in the months leading up to the training, you will want to clearly communicate the objectives of the training. Try to be explicit in the training's learning objectives and having a finalized agenda helps you do so.

2 months out gives you time to set up your virtual space in which you will deliver the online training. This will depend upon the software you are using, but if you plan to handle registration through that software then a completed webspace will be needed. A training webpage to point potential participants to is a good practice, and this will communicate the learning objectives, details on how to register or when to attend, and any prerequisites you may have. This can also serve as the location for the agenda and training materials you post prior to, or throughout the training.

For instance, did you know this training has a webpage? We will post the URL to the chat.

1 month prior, we find is the time to get all training materials completed. There tends to be a lot going on during the last few weeks before a training, and if you give live webinars as we do, and you wait longer to complete the powerpoint slides, exercises and homework, and it can easily become overwhelming. One month gives you time to edit sufficiently, translate if you plan to do so, and update any surveys you give with the specifics of that training.

[Slide 29] Timelines & Deliverables (3 weeks - last day of training)

Given this is an online training, you want to be sure that the presenters are familiar with the delivery software. This includes a knowledge of how to use the software, conduct any interactive elements you may include, and most importantly, that their microphone is working properly and is clear. Be sure

to test microphones on the computer they plan to use that day and that they do not plan to be in a room with a lot of background noise or echo. Essentially, simulate the actual day of presentation as much as possible in practice sessions.

With 2 weeks to go, complete all training materials and upload them to the training webpage and into the delivery software. Participants may want to review the slides beforehand. Also, find a good method to time your reminders to attend the training.

After the training, we always post the recording online with a day or two, and on the last day, distribute a survey if you use one.

[Slide 30] Timelines & Deliverables (after training)

Once again, reminders to complete the initial survey is a good practice and if you use a second survey to assess impact, 6 months after is typically enough time out for participants to have a chance to use and apply the data to their work

[Slide 31] Transition Slide: Summary

This brings us to our summary of the week.

[Slide 32] Week 3 Outline

In this final week we talked about the specific to conducting an online training, from the many different formats and structure, to attributes of the software used to deliver the training, and a timeline we at ARSET have found useful.

[Slide 33] Seven Steps to a Successful Remote Sensing Training

So to review, we found there are seven steps to a successful remote sensing training.

Developing a Training Mission Statement, Assessing End-User Needs, Networking and training Promotion we covered in Week 1.

We then talked about Developing Training Material, Conducting the actual trainings for both onsite and online and finally, methods we can use to Evaluate or assess the impact of our Trainings.

There was a lot to cover and as we saw during the forums, many more details we can discuss and learn from each other. I hope we all as a community find ways to continue these conversations.