



# Welcome to the Radar & Applications Course (RAC)!

- Federal Instructors
- History of this course
- Commerce Learning Center (CLC)
- WES-2 Bridge
- Objectives and Quizzes
- Course content
- Support



Welcome to the Radar & Applications Course (RAC) conducted by the NWS Warning Decision Training Division (WDTD). The primary purpose of the RAC is to train NWS forecasters (meteorologists and hydrologists) on the use of the radar in the forecast and warning decision making process. In this Orientation session we will cover:

 **NOTE:** *Teach from slide*

# Federal Instructors



 **NOTE:** Teach from slide

# History of this Course



- WSR-88D Operations Course
  - 1990-97
  - 3.5 week in-residence course in Norman
- Distance Learning Operations Course (DLOC)
  - 1997-2015
  - 100+ hours of training
  - 1-week workshop
    - Boulder (2000-2004)
    - Norman (2005-present)
- Radar & Applications Course (RAC)
  - 2015-Present
  - Name change; same format as DLOC

This course has steadily evolved over the years, but the focus has always been on the use of the WSR-88D in operations, particularly warning operations. It began in 1990 as the WSR-88D Operations Course which was taught as a 3 & 1/2 week in-residence course in Norman, Oklahoma. In 1997, it transitioned into the Distance Learning Operations Course (DLOC) and provided a blended learning approach which included web-based training, on-line modules, teletraining, and a 1-week workshop delivered at its conclusion. The name was changed to the Radar & Applications Course (RAC) in 2015 to provide a more accurate and meaningful description of the course, but it maintains the same format as DLOC.

# Commerce Learning Center (CLC)

- Various lesson types:
  - More on this later
- Completion status tracked via the CLC
  - Lesson quizzes
  - WES activities
  - Instructor-led training (ILT)



We use the Commerce Learning Center (CLC) to track your completion of each part of the RAC. We recommend you bookmark the web address <https://doc.csod.com>. Most of the lessons are on-line training that you will launch directly from the CLC. Other training (such as AWIPS Fundamentals) will be taken on your local WES machine, but you will need to come back to the CLC and take some action in order to show up as complete. The RAC curriculum in the CLC contains three instructor-led training events. The first two are webinars like this orientation session. The third is the RAC workshop. You will need to sign up for all three in the CLC first. Lastly, there is the AWIPS Proficiency exam. This exam will be completely locally at your office, then mailed to WDTD. Once we receive your exam, we will mark you complete in the CLC.

# Commerce Learning Center (CLC): RAC Curricula

- Take most RAC topic lessons in order
- Register for teletraining
- Register for workshops
- Track your progress

https://doc.csod.com

Commerce LEARNING CENTER  
1000 UNIVERSITY BLVD, SUITE 1000

Home Learning Need Help? Programs

FY17 Radar & Applications Course Full Course

3%

CURRICULUM PROGRESS

**FY17 Radar & Applications Course: Full Course**

- FY17 RAC: INTRODUCTION TO THE WSR-88D SYSTEM
- FY17 RAC: PRINCIPLES OF RADAR
- FY17 RAC: VELOCITY INTERPRETATION

The Radar & Applications Course provides initial training on the use of the WSR-88D Radar. The primary purpose of the RAC is to train NWS forecasters (meteorologists and hydrologists) on the use of the radar in the forecast and warning decision making process. The course covers Doppler radar theory, technological aspects of the WSR-88D as it is used in AWIPS, management of the data stream via the Radar Product Generator (RPG), the infusion of science and application of conceptual models, and the development of methodologies for use in an operational setting.

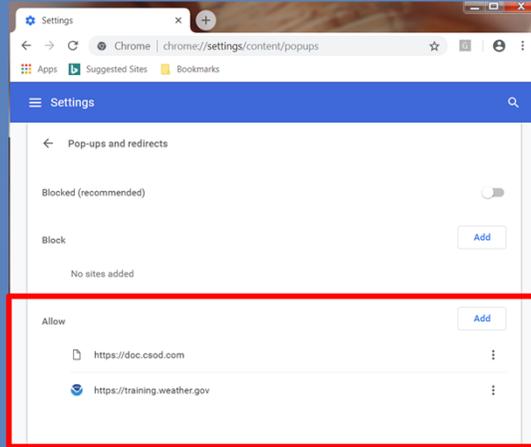
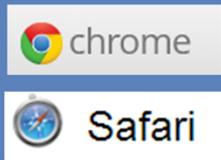
Module	Completed	Min Required	Total Items	Action
FY17 RAC: Introduction to the WSR-88D System	0%	1	1	<a href="#">View Details</a>
FY17 RAC: Principles of Radar	0%	24	24	<a href="#">View Details</a>
FY17 RAC: Velocity Interpretation	0%	2	2	<a href="#">View Details</a>
FY17 RAC: Base and Derived Products	0%	23	23	<a href="#">View Details</a>

RAC Curriculum on your transcript

Your RAC Curriculum is your path to course completion.

# Commerce Learning Center (CLC): Optimizing Use

- Preferred browsers
- Either turn off popup blocker or whitelist both the CLC and WDTD



Google Chrome is the preferred browser for the CLC. Safari also works for mobile users. Other browsers may have issues.

If you have popup blockers on, you will not see the presentations appear when you select them unless you create an exception for the CLC and WDTD web sites.

# WES-2 Bridge (Weather Event Simulator for AWIPS-2)

<https://training.weather.gov/wdtd/tools/wes2/>



Point of Contact:  
[Dale.Morris@noaa.gov](mailto:Dale.Morris@noaa.gov)

The screenshot shows the NOAA Warning Decision Training Division website. The header includes the NOAA logo and the text "WARNING DECISION TRAINING DIVISION NOAA / NATIONAL WEATHER SERVICE". A navigation menu contains links for "WDTD HOME", "MAIN COURSES", "TRAINING INFO", "TRAINING TOOLS", "SUPPORT INFO", "NEWS", "SEARCH", and "ABOUT". A search bar is located on the right. Below the header, there is a "WES-2 Bridge News" section with a "Local forecast by" field and a "Go" button. A "Commerce Learning Center" logo is visible. The main content area features a "WES-2 Bridge (Weather Event Simulator for AWIPS-2)" section with a "Warning Decision Training Division Office of Chief Learning Officer" header. It includes a "TRAINING COURSE CALENDAR" widget, a "Current Status" section with a "Residence & Virtual Courses" icon, and a "Subscribe to the WES List" section with a "Web-Based Training Release Dates" icon. A "Known Issues" section is also present, with a note that a more complete list of issues is located on the Support Page and a "Connectivity Preferences Window" link.

WES-2 Bridge is a weather event simulator for AWIPS-2. You will use it during both the distance learning and in-residence Workshop lab portions of RAC. Your point of contact for WES-2 Bridge support is Dale Morris.

# Types of Training Modes

- Web modules
  - Completed asynchronously
  - Self guided (no audio)
  - Instructor guided (with audio)
- Live, instructor-led teletraining sessions (like this!)
  - You must pre-register & take at the scheduled time
- AWIPS/WES exercises



RAC presents training material in various ways. Some are self-paced modules on the internet. Others are recorded “Articulate” modules where the instructor’s voice is paired with the relevant images. Another method is via live teletraining session (like this one) where you and your classmates go through material together with a WDTD instructor. You must pre-register for each teletraining session via the RAC curriculum in the CLC and take it at the scheduled time.

# Objectives

- Learning Objectives
  - Evaluated via end-of-lesson quizzes
- Performance Objectives
  - Evaluated by your training facilitator and WDTD instructors



Each lesson contains learning and/or performance objectives. A learning objective is an outcome statement that captures specifically what knowledge, skills, and attitudes learners should be able to exhibit following instruction. We assess it in RAC via an end-of-lesson quiz.

A performance objective is a statement that clearly describes the behavior or performance the learner is expected to exhibit as a result of training. We assess it in RAC via AWIPS WES exercises by your training facilitator, the AWIPS Proficiency Exam by your training facilitator, and at the RAC Workshop Lab by WDTD instructors.

## End-of-Lesson Quizzes

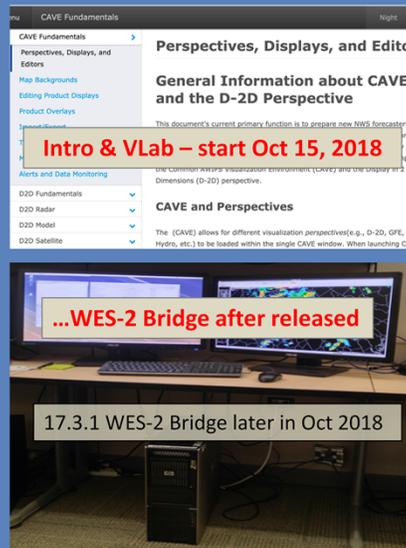
- Must be completed on the Commerce Learning Center (CLC)
- Taken at your office
- Passing score is 70-80%



 **NOTE:** *Teach from slide*

## Topic: AWIPS 17.3.1 Convective Warning Fundamentals

- Prepares you for performance drills, workshop primer & simulations, proficiency test
- Delivery Method
  1. VLab web pages with [job sheets](#)
    - Most use live 17.3.1 AWIPS & WES-2 Bridge
    - Some use live 18.1.1
  2. WES-2 Bridge practice videos
  3. Proficiency Test
- Prerequisite: RAC Orientation
- Expected Completion Time: 15-30hrs



Let's discuss the RAC Topics.

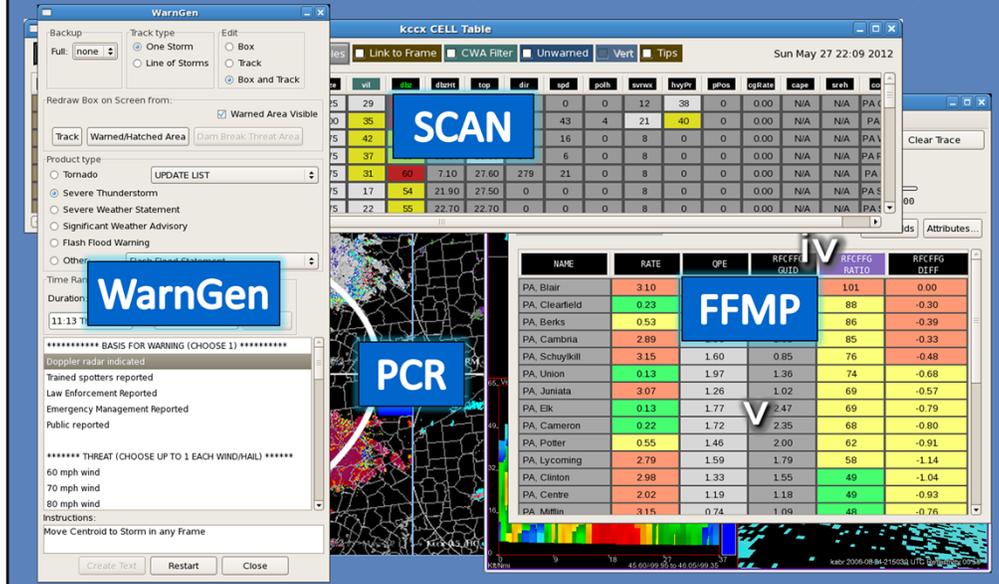
The AWIPS Convective Warning Fundamentals, which is also a stand alone course, develops fundamental radar and warning proficiency with AWIPS. You will need this when you start implementing RAC training into the RAC warning decision making exercises and simulations in the workshop primer and workshops. All RAC students must take it, including "experienced" forecasters, because it's important that everyone have the same WDTD approved skill set and be on the same page when they work together as a warning team in our Workshop simulation/scenarios.

The delivery method is a blend of VLab and WES-2 Bridge. Most of the VLab web pages and job sheets are taken on the live AWIPS which will be 17.3.1 for most sites and 18.1.1 for others. The practice videos must be taken on the WES-2 Bridge and will require the 17.3.1 WES-2 Bridge which is planned to be released later in Oct 2018.

You can start the Intro module and VLab part of the AWIPS 17.3.1 Convective Warning Fundamentals on Oct 15<sup>th</sup> when that course update is released. Expect both VLab and WES-2 Bridge exercises it to take 15-30 hours. In the future you will likely not have much time for AWIPS training, so this is a unique opportunity to develop a deep and solid foundation of AWIPS needed for warning decision making.

## Complete All WES Exercises

Do these before Storm-Based Warning  
Fundamentals Workshop Primer and the Workshop!



The WES Exercises cover AWIPS applications that you will use in warning decision making in your job.

**NOTE:** Click five (5) times to reveal tools.

It is important for you to develop a basic proficiency with these different AWIPS tools even if your current office doesn't use all of them because you will likely use some of these at different offices in your career and you need the latest exposure to all these tools to make an informed decision about what tools ultimately work best for you.

You must develop a basic proficiency with these before you take the workshop primer and before you arrive at the RAC Workshop.

## Topic: AWIPS 17.3.1 Convective Warning Fundamentals-Proficiency Test

- Demonstrate AWIPS radar and warning proficiency
  - Student will see assignment in CLC
  - Administered by training facilitator
- Score of at least 70% required
  - Retake at discretion of training facilitator
  - Training facilitator: Scan and email [Michael.A.Magsig@noaa.gov](mailto:Michael.A.Magsig@noaa.gov)
  - WDTD marks test “complete” in CLC
- **Must complete before the Storm-Based Warning Fundamentals Workshop Primer & Workshop**
  - **Not required to start other RAC topics**



You will see the AWIPS Proficiency Exam listed as an assignment in the CLC. It is a timed, paper exam administered by your training facilitator. The facilitator will observe your performance of specific AWIPS tasks. You will need to achieve a passing score of at least 70% on the exam to receive credit. You may retake the exam at the discretion of your training facilitator. Once complete, your training facilitator must send the graded exam back to WDTD (scan and email fine or regular mail). We will then mark the test “complete” in the CLC.

You must complete the AWIPS Proficiency Exam before the Workshop Primer and the Workshop, but you don't need to complete it before starting the other RAC topics.

## Topic: AWIPS 17.3.1 Convective Warning Fundamentals FY19 WES Exercises Release (Later in Oct 2018)

1. Disks containing 17.3.1 Weather Event Simulator 2 Bridge, cases, videos, and instructions
  - AWIPS Fundamentals videos
  - Applied Performance Drills videos (new on WES)
2. AWIPS Proficiency Test (Training Officers Only)
  - 17.3.1 WES-2 Bridge upgrade required for RAC



The AWIPS Fundamentals and WES exercises are anticipated to ship later in October 2018 when 17.3.1 WES-2 Bridge development is complete. The shipment will contain the 17.3.1 WES-2 Bridge, cases, and other support materials including the Applied Performance Drill videos and the AWIPS Proficiency Test.

Because 17.3.1 is the baseline for this year's RAC workshops, the 17.3.1 WES-2 Bridge is a requirement for RAC.

This will still give you 3-4 months to complete the AWIPS components of the course before workshops begin in Jan/Feb.

# Topic: Introduction to the WSR-88D System

- Overall system description covering equipment groups
  - Self guided web module
- Delivery Method
  - 1 hour
- Completion Time
  - 1 hour

RAC: Introduction to the Weather Surveillance Radar 1988 Doppler (WSR-88D)

Introduction

Objectives

System Requirements

System Diagram

1. Radar Data Acquisition (RDA) Unit

2. Wideband Communications

3. Radar Product Generator (RPG)

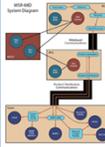
4. Master System Control Function (MSCF)

5. Product Distribution Communications

6. User Systems

Acronym Listing

Click below to view full-size graphic



Introduction



Welcome to the "RAC: Introduction to the Weather Surveillance Radar - 88 Doppler (WSR-88D)" web module.

**Note to NWS Staff:**

To receive credit for the RAC: Introduction to the WSR-88D Training, you must login to the [NWS Learning Center](#) and complete the quiz in order to receive completion credit on your transcript!

The WSR-88D system contains several data processing, control, and display components. Some of these units also employ multiple subcomponents. NWS forecasters should have a basic understanding of the WSR-88D system in order to effectively produce the best quality data. This understanding includes knowledge of the components (and subcomponents), their relationship to each other, and the flow of data through the system. This lesson describes the five equipment (or component) groups and their primary subcomponents, as well as some of the user systems that visualize WSR-88D output. These six different groups are the:

- Radar Data Acquisition Unit (RDA),
- Wideband Communications between the RDA and The Radar Product Generator,
- Radar Product Generator (RPG),
- Master System Control Function (MSCF),
- Product Distribution Communications, and
- User Systems (e.g., Advanced Weather Interactive Processing System, Open Principal User Processor).

 **NOTE:** Teach from slide

## Topic: Principles of Meteorological Doppler Radar

- How the WSR-88D collects, quality controls, and processes data into products
- Proceed through the lessons in order
- Delivery Method
  - Instructor guided web modules
- Completion Time
  - 7 hours



 **NOTE:** Teach from slide

## Topic: Velocity Interpretation

- How to interpret both large and small scale velocity patterns
- Delivery method
  - Instructor guided web modules
- Completion Time
  - 1 hour



 **NOTE:** Teach from slide

## Topic: Base and Derived Products

- Covers products and the algorithms that generate them
- Delivery method
  - Instructor guided web modules
  - Instructor Led Training (ILT) session
- Completion time
  - 10 hours



 **NOTE:** Teach from slide

## Topic: Base and Derived Products (Cont'd)

Introduction and Base Products	Instructor Guided Web Modules	2.5 hrs
Reflectivity Derived Products	Instructor Guided Web Modules	2.0 hrs
Velocity Derived Products	Instructor Guided Web Modules	1 hr
Dual-Pol Derived Products	Instructor Guided Web Modules	1 hr
Precipitation Estimation Products	Instructor Guided Web Modules	1.5 hrs
Base and Derived Products ILT (Review & Case Study)	Teletraining	2.0 hrs

Students must register for Teletraining portion

The lessons in this topic are organized into sections.

The final lesson “Products Review & Case Study” is an Instructor-Led Teletraining session. You must pre-register in the CLC for one of the sessions.

# Topic: Winter Weather

- Precipitation type analysis
- Accounting for errors in Snow Accumulation Algorithm (SAA)
- Delivery method
  - Instructor guided web modules
- Completion Time
  - 1 hour



 **NOTE:** Teach from slide

## Topic: Convective Storm Structure and Evolution

- Thunderstorms and all things severe
- Prerequisites
  - Skew-T Mastery (COMET module)
  - Hodograph Essentials for Convective Storms
  - Multi-Radar/Multi-Sensor (MRMS) Products Course
  - Operational Severe Weather Diagnostics Parameters
- Delivery method
  - Instructor guided web modules
  - Applied Performance Drills on WES
- Completion time
  - 12 hours



 **NOTE:** Teach from slide

# Topic: Flash Floods

- Covers concepts, products and tools useful for flash flood forecasting and decision-making
- Prerequisites
  - MRMS Hydro Products Course
  - FLASH Products Course
- Delivery method
  - Instructor guided web modules
- Completion time
  - 2-2.5 hours



 **NOTE:** Teach from slide

# Topic: Warning Fundamentals

- “Polygonology” and wording of warnings
- Delivery Method
  - Instructor guided web modules
  - Instructor-led training
- Completion time
  - 4 hours



 **NOTE:** Teach from slide

## Topic: Warning Fundamentals (Cont'd)

Lesson Title	Time
Drawing the Warning, Part 1: Fundamentals	10 min
Drawing the Warning, Part 2: Additional Considerations	6 min
Drawing the Warning, Part 3: Complex Scenarios	10 min
Warning Content: Impact-Based Warnings	10min
After the Warning Is Issued: Continuation, Cancellation, and Expiration	7 min
Impact-Based Warnings (2 modules plus 5 exercises)	2 hours
Convective Storms & Warning Fundamentals ILT	2 hours

 **NOTE:** Teach from slide

## Topic: Storm-Based Warning Fundamentals Workshop Primer Practice on WES (2-3hrs)

- Prepare for week of simulation nirvana
- Workshop catalyst
  - Put it all together
  - Use workshop procedures
- **When: Week before the workshop (or as near as you can)**
- Materials will ship in late 2018



Point of Contact:  
[Michael.A.Magsig@noaa.gov](mailto:Michael.A.Magsig@noaa.gov)  
Phone: 1-405-325-2995

One very important exercise that will prepare you for the week of simulation nirvana at the workshop is the workshop primer. In this catalyst for the workshop, you will start to put everything together to issue warnings on WES, and you will get a head start on using workshop AWIPS procedures.

The videos will play on one monitor and you will practice the same steps on the other monitor.

The workshop primer should be completed the week before the workshop (or as near as you can), so you are prepared to maximize your growth in the workshop.

The Workshop Primer will be released later in 2018 well before you need to take it.

Mike is really committed to making this an effective exercise, so do not hesitate to contact him if you have any questions or problems setting it up, running the simulation, or have some general questions about the tools or the decision making. He wants to hear from you!

## Topic: RAC Workshop

- Sessions include:
  - Warning Decision and You
  - Warning Methodology
  - Mini-Scenarios
  - Flash Flood Forecasting
  - Flash Flood Lab (pt 1 & 2)
  - Warning Issuance
  - Simulation Scenarios
  - Communication and Team Dynamics
  - Hazardous Weather Testbed (HWT) Visit
  - Storm Prediction Center (SPC) Visit



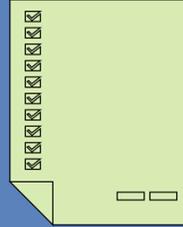
The Workshop is the culmination of RAC. It brings together everything you've learned, and more, into a laboratory and simulation environment. Most of your time at the workshop will be in the lab. Typically, you'll work with two (2) other forecasters and go through events in displaced real-time together. Sessions include:

 **NOTE:** *Teach from slide.*

# Topic: RAC Workshop

## Prerequisites

- All distance learning must be completed before the workshop, including:
  - All lesson quizzes
  - AWIPS Proficiency Exam
  - WES Exercises
  - Workshop Primer
- Arrive at workshop “warning ready” including:
  - AWIPS “knobology”
  - WarnGen fundamentals



Put me in Coach. I'm ready to play!

You must complete all distance learning components before you may attend the workshop including: Lessons quizzes, AWIPS proficiency exam, WES exercises, and the Workshop Primer. Students must arrive at the workshop “warning ready” including AWIPS “knobology” and WarnGen fundamentals. We want you to get the basics out of the way so we can work on your higher order “warning forecaster” skills at the workshop.

# Topic: RAC Workshop Delivery Method

- In-residence at the National Weather Center (NWC)
- Five Workshops:
  - Jan 28 - Feb 01, 2019
  - Feb 11-15, 2019
  - Feb 25 – March 1, 2019
  - March 11-15, 2019
  - March 25-29, 2019
- Registration opens Oct 5, 2018
  - If only **one** week works for you, register early!
- Completion time
  - 40 hours (Monday-Friday)
  - Many students will not be able to fly home until Saturday!



 **NOTE:** Teach from slide

## Topic: RAC Workshop Lodging

- Lodging
  - National Center for Employee Development (NCED) Conference Center and Hotel
  - Provide WDTD with your travel info when you register for a workshop using the CLC



Workshop lodging will be at the National Center for Employee Development (NCED) Conference Center and Hotel located three miles east of the National Weather Center (NWC) in Norman. Most of the hotel's guests are postal service employees in-training as students in the NCED Training Facility on the same grounds across the street. You will be asked to provide WDTD with your travel information when you register for a workshop in the RAC curriculum section of your NWS CLC account.

## RAC Summary

### *Meteorologist vs Hydrologist Track*

Orientation	MET, HYDRO
Introduction to the WSR-88D	MET, HYDRO
Principles of Doppler Radar	MET, HYDRO
Velocity Interpretation	MET, HYDRO
Base and Derived Products	MET, HYDRO
Winter Weather	MET
Convective Storm Structure and Evolution	MET
Flash Floods	MET
Storm-Based Warning Fundamentals	MET
Workshop (Norman, OK)	MET

*Note: "Hydro" track completion deadline is December 20, 2018*

Note that most students have been assigned the Meteorologist Track version of the course, but a few have been assigned the Hydrologist Track. Deadline for the Meteorologist Track is before the start of your workshop. Deadline to complete the Hydrologist Track version of the course is December 20, 2017.

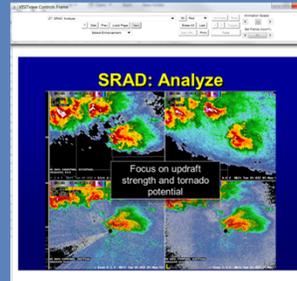
# Teletraining Overview

1. Register for the two ILT sessions of your choice in your CLC curriculum.

- Each student must register individually to receive credit
- Register at least 24 hours in advance

2. Register for the accompanying GoToMeeting webinar

- Use instructions in your "Approval" Email sent by the CLC
- Contact [nws.wdtd.rachelp@noaa.gov](mailto:nws.wdtd.rachelp@noaa.gov) if the Email hasn't arrived within 24 hours



START DATE	END DATE	SESSION ID	LOCATOR NUMBER	TRAINING HOURS	LOCATION	SEATS AVAILABLE	WAITLISTED	DETAILS	REQUEST
11/16/2015	11/16/2015	RAC FY16 Orientation Session 1	2634	1 Hours 0 Min	WDTD Webinar > WDTD	5	0		Request
11/17/2015	11/17/2015	RAC FY16 Orientation Session 2	2635	1 Hours 0 Min	WDTD Webinar > WDTD	10	0		Request
11/19/2015	11/19/2015	RAC FY16 Orientation Session 3	2636	1 Hours 0 Min	WDTD Webinar > WDTD	8	0		Request
11/20/2015	11/20/2015	RAC FY16 Orientation Session 4	2637	1 Hours 0 Min	WDTD Webinar > WDTD	14	0		Request
11/23/2015	11/23/2015	RAC FY16 Orientation Session 5	2638	1 Hours 0 Min	WDTD Webinar > WDTD	10	0		Request
11/24/2015	11/24/2015	RAC FY16 Orientation Session 6	2672	1 Hours 0 Min	WDTD Webinar > WDTD	10	0		Request

Teletraining means we train live over the internet, like what you're doing now.

After this Orientation teletraining session is over, you will have two more: One at the end of the Based and Derived Products topic and another at the end of the Warning Fundamentals topic. The registration steps are:

1. Register for the instructor-led training (ILT) session of your choice in your Commerce Learning Center (CLC) curriculum. Each student must register individually to receive credit in the CLC, even if multiple students from the same office attend the same session. Register at least 24 hours in advance.
2. Register for the accompanying GoToMeeting webinar using instructions in your "Approval" Email sent by the CLC. Contact WDTD ([nws.wdtd.rachelp@noaa.gov](mailto:nws.wdtd.rachelp@noaa.gov)) if the Email hasn't arrived within 24 hours

The audio for each session is via WDTD's RAC Line, 1-866-564-5812. Student passcode is 2094167#

# Teletraining Protocol

- Dedicate time for your session
  - *“Do not disturb!”*
- Use headsets
  - *Keep phones muted, not “hold”*
- Expect interaction
  - *Direct questions*
  - *Quiz questions*
  - *Annotate features*



 **NOTE:** Teach from slide

# Facilitator Actions

- Coordinate scheduling of training events
  - No office conflicts
- Monitor progress
- Provide time/support
  - Reach out to WDTD if necessary



Your training facilitator plays a critical role. He/she must: coordinate the scheduling of training events, monitor your progress and provide time and support and reach out to WDTD if necessary. Your training facilitator is our partner in this. We all want you to have a great training experience.

# More Facilitator Actions

- Install & test WES exercise materials
  - Testing instructions provided with AWIPS Fundamentals
- Proctor AWIPS Proficiency Test in advance of workshop

WSR-88D DISTANCE LEARNING OPERATIONS COURSE  
WARNING DECISION TRAINING BRANCH  
AWIPS OPERATOR PROFICIENCY EXAM...EVALUATOR  
VERSION

STUDENT \_\_\_\_\_ DATE \_\_\_\_\_  
EVALUATOR \_\_\_\_\_ TEST SCORE 100%

Instructions:

- The following exam contains 40 questions that require the student to perform certain operations and/or make appropriate verbal responses. Many questions are worth 1 or 2 points each, with the rest worth more. There are a total of 100 possible points. The exam should be completed in 100 minutes or less. Please give students a few minutes to read over the instructions before beginning the exam.
- The student will use an AWIPS D-2D workstation (with at least OB9.0 loaded), preferably in practice mode, to perform all functions. The Topic 1 Student Guide, the AWIPS User Manual, personal notes or pre-saved office procedures on the AWIPS workstation are not allowed. You may review items on the exam with the student before the exam, but during the exam please do not provide any assistance to the student.
- You are the evaluator, and responsible for administering this test. Keep track of time for the student. You may clarify questions, but please do not give hints or let them know if their answer is right or wrong unless, in your opinion, their wrong answer prevents them from correctly answering subsequent questions. In these situations, the student must acknowledge that they have made their final attempt prior to you.

Facilitators must also install and test the WES exercise materials and proctor the AWIPS Proficiency Test in advance of the Workshop. Testing instructions will be provided with AWIPS Fundamentals.

*It is important for the facilitator to verify the WES is set up and works. We will have guidance provided with the AWIPS Fundamentals release.*

## Be “Warning Ready”...for anything!

- RAC will expose you to new phenomena and tools
- Will likely be used in your career
- Thus, it’s to your benefit to take ownership over ALL the material in this course.

The screenshot shows the 'FFMP Basin Table' software interface. At the top, there are menu options: File, Config, D2D, Layer, Zoom, CWA, Click. Below the menu is a 'Config Summary' window showing the date 'May 27 12 22:13:59 GMT' and a 'Clear Trace' button. A 'Gap' field is set to '0.00 (hrs.)' and a 'Time Duration (hrs.)' slider is set to '1.50'. A 'Rate' slider ranges from 0.00 to 24.00. Below these controls is a table with columns: NAME, RATE, OPE, RCFEFG GUID, RCFEFG RATIO, and RCFEFG DIFF. A large blue 'FFMP' logo is overlaid on the table. The table contains 16 rows of data for various basins in Pennsylvania.

NAME	RATE	OPE	RCFEFG GUID	RCFEFG RATIO	RCFEFG DIFF
PA Blair	3.10			101	0.00
PA Clearfield	0.23			88	-0.30
PA Berks	0.53			86	-0.39
PA Cambria	2.89			85	-0.33
PA Schuylkill	3.15	1.60	0.85	76	-0.48
PA Union	0.13	1.97	1.36	74	-0.68
PA Juniata	3.07	1.26	1.02	69	-0.57
PA Elk	0.13	1.77	2.47	69	-0.79
PA Cameron	0.22	1.72	2.35	68	-0.80
PA Potter	0.55	1.46	2.00	62	-0.91
PA Lycoming	2.79	1.59	1.79	58	-1.14
PA Clinton	2.98	1.33	1.55	49	-1.04
PA Centre	2.02	1.19	1.18	49	-0.93
PA Millin	3.15	0.74	1.09	48	-0.76

RAC will expose you to a wide variety of meteorological phenomena and tools, many of which may be new to you. For example, you may be at an office that experiences very little severe weather, very little winter weather, or one that doesn’t use the Flash Flood Monitoring and Prediction (FFMP) tool. The fundamentals you will learn as a new NWS Meteorologist taking RAC will likely be used later in your career, probably within the next few years as you advance on to other offices. Thus, it’s to your benefit to take ownership over ALL the material in this course.

# Upcoming Events

Event	Date	Time (Z)
Registration Opens: ILTs and Workshop	10/5/2018	20Z
<b>RAC Begins</b>	<b>10/10/2018</b>	
AWIPS Fundamentals Intro and Vlab components	10/15/2018	
WES-2 Bridge (latest build), AWIPS Fundamentals videos, Applied Performance Drills videos, AWIPS Proficiency Test mailed to students	Late Oct 2018	
Base & Derived Products ILT, session 1	10/30/2018	16Z
Base & Derived Products ILT, session 2	11/13/2018	19Z
Base & Derived Products ILT, session 3	11/20/2018	19Z
Base & Derived Products ILT, session 4	11/27/2018	16Z
Base & Derived Products ILT, session 5	12/6/2018	16Z
Base & Derived Products ILT, session 6	12/13/2018	16Z
Base & Derived Products ILT, session 7	12/20/2018	19Z
Hydrologist Track ends	12/20/2018	
Convective Storms & Warning Funds ILT, session 1	12/20/2018	16Z
Workshop Primer mailed to students	Late Dec 2018	
Convective Storms & Warning Funds ILT session 2	1/8/2019	19Z
Convective Storms & Warning Funds ILT, session 3	1/15/2019	19Z
Convective Storms & Warning Funds ILT session 4	1/23/2019	16Z
<b>Workshop 1</b>	<b>01/28/2019 to 02/01/2019</b>	
Convective Storms & Warning Funds ILT session 5	2/6/2019	19Z
<b>Workshop 2</b>	<b>02/11/2019 to 02/15/2019</b>	
Convective Storms & Warning Funds ILT, session 6	2/20/2019	19Z
<b>Workshop 3</b>	<b>02/25/2019 to 03/01/2019</b>	
Convective Storms & Warning Funds ILT, session 7	3/5/2019	19Z
<b>Workshop 4</b>	<b>03/11/2019 to 03/15/2019</b>	
<b>Workshop 5</b>	<b>03/25/2019 to 03/29/2019</b>	

 **NOTE:** Teach from slide

## Lesson Completions – Stay on Pace!

- RAC is a HUGE course
  - over 100 hours
- All distance learning must be completed before a student is permitted to attend their workshop.
- Bobby will send frequent status updates
  - Will include latest “RAC Training Completion Report”



Please be aware that RAC is a **HUGE** course (over 100 hours) and all distance learning must be completed before a student is permitted to attend their RAC workshop. Thus, it's important to stay on pace. It takes a big time commitment from the student and support for that time commitment from co-workers and the management team.

The RAC Project Manager (Bobby Prentice) will send frequent RAC Status updates which include the latest “RAC Training Completion Report” and the number of lesson completions students should have in order to stay on pace.

# RAC Web Page

<https://training.weather.gov/wtdt/courses/rac/>

- News and Notes
- Course Description
- RAC Pages
  - Course Outline
  - Course Support
  - Webinar Registration Information

**WARNING DECISION TRAINING DIVISION**  
NOAA NATIONAL WEATHER SERVICE

WDT HOME MAIN COURSES TRAINING INFO TRAINING TOOLS SUPPORT INFO NEWS SEARCH ABOUT

Local forecast by "City, ST or ZIP code" Enter location... Go Location Help

**Radar & Applications Course News**  
The FY18 offering of RAC wrapped up in March. Registration for the FY19 Radar and Applications Course will occur during the summer. Check this page occasionally for updates.

**The Radar & Applications Course (RAC) Warning Decision Training Division FY18**  
Weather.gov > Chief Learning Officer Training Portal > Warning Decision Training Division > Courses > RAC

**News and Notes**  
The FY18 version of the course wrapped up with the RAC workshops (ending in March). Registration for the FY19 Radar and Applications Course will occur during the summer.  
NOTE: The FY19 RAC content will not be available until sometime in September; if you are planning on taking the FY19 version of RAC, we strongly recommend that you wait until the Fall of 2018 before completing any RAC coursework in the CLC.

**Course Description**  
The Radar & Applications Course provides initial training on the use of the WSR-88D Radar. The primary purpose of the RAC is to train NWS forecasters (meteorologists and hydrologists) on the use of the radar in the forecast and warning decision making process. The course covers Doppler radar theory, technological aspects of the WSR-88D as it is used in AWIPS, management of the data stream via the Radar Product Generator (RPG), the infusion of science and application of conceptual models, and the development of methodologies for use in an operational setting.  
The RAC was initially taught as a 3 1/2 week residence course in Norman, Oklahoma, from 1990 to 1997. The current format is a blended learning approach including on-line modules, instructor-led webinars, and a 1-week workshop delivered at its conclusion in Norman. The course is very comprehensive and involves around 116 hours of material over the span of about 6 months. At present the course is taught once a year with the current offering beginning in the Fall of 2017 and ending in Spring 2018.

**RAC Pages**  
Here are some important links to other RAC pages:

- [Course Outline](#)
- [Course Support](#)
- [Webinar Registration Information](#)

Follow WDTD on Facebook Follow NWSTC on Facebook Follow NWSTC on YouTube NWS RSS Feed

The RAC web page is a good source for course information and support. Note...although the course outline has links to lessons on our WDTD web site and the CLC, you must access the lessons from your RAC curriculum on the CLC to receive credit.

# RAC Support

1. Your office's training facilitator (i.e., SOO/DOH)
2. The RAC Help Email list [nws.wdtd.rachelp@noaa.gov](mailto:nws.wdtd.rachelp@noaa.gov)
  - Better for general inquiries and quick responses
3. Contact instructors directly

The screenshot shows a web interface for the Radar & Applications Course (RAC). At the top, it says 'Severe Hail (00:07 / 32:52)'. Below that, there are logos for NOAA, WDT, and WDTD. A red box highlights the profile of Robert (Bobby) Prentice, Meteorologist (Instructor), with a 'Send an email' link. A red arrow points from the third list item above to this profile. The page also features a large image of a radar dome and the text 'Radar & Applications Course (RAC)' overlaid on it.

There are three sources of RAC support:

1. Your office's training facilitator (usually your SOO or DOH).
2. The RAC Help Email list which contacts the entire WDTD RAC Team. This is better for general inquiries and quick responses (for example, instructor is out of the office).
3. Contact instructors directly

The RAC Project Manager (Bobby Prentice) will also send RAC status updates via e-mail.

# Questions?



Lab



Classroom

 **NOTE:** Ask each office individually if they have any questions.