

# **TRAINING ACTIVITIES ON METEOROLOGICAL INSTRUMENTS AND OBSERVING SYSTEMS IN TURKEY**

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## **ABSTRACT**

Recently, Turkish State Meteorological Service (TSMS) started a modernization program of observing systems including Automated Weather Observing Systems (AWOS) and Weather Radars. This program is still under process and, new and modern observing systems have been installed for renovation the existing observing network of TSMS. As an important component of that modernization program, a project of training of trainers was implemented and the key staffs of TSMS have received training courses from manufacturers and international experts on both operation/interpretation and maintenance/calibration of the systems. As a result of those activities, TSMS has caught a very important level on meteorological instruments and observing systems. And then, as an active member of WMO on Regional Metrological Training Activities, TSMS has planned to organize regular training courses on weather observing systems in line with the general training policy of TSMS to train its own staff for operating the systems more efficiently to increase the meteorological service given as well as to support the activities of Expert Team on Training Materials and Training Activities established by CIMO Management Group (*OPAG on Capacity Building (OPAG-CB)/C.1. Expert Team on Training Activities and Training Materials*).

So, national and international training courses on Automated Weather Observing Systems (AWOS) and Weather Radars were organized by TSMS in 2005 and 2006 in Turkey. 31 trainees from the other countries and 104 trainees from Turkey participated in those training courses.

## **TRAINING ACTIVITIES**

### **1. INTRODUCTION**

Training courses on meteorological instruments and observing systems were planned to be held by Turkish State Meteorological Service for its own operations as well as supporting the international activities, particularly to support the tasks of Expert Team on Training Materials and Training Activities.

As a result of the developing technology, the methods and techniques of the observations have also been developed and the meteorological parameters to be observed have been increased significantly. This fact and following major issues were considered while preparing the training programs and training materials :

- a) to give lectures efficiently as much as possible
- b) to make the lectures more interesting for the trainees without boring them
- c) to support the theoretical lectures with practical (hands-on) training
- d) to make the trainees participate in the lectures actively for an interactive training
- e) to show the historical and cultural heritage of regions to the trainees

As it was planned and expected, a general view and information about the necessity and importance of the meteorological observations, the basic features of Automated Weather Observing System (AWOS) and weather radars and, how to operate the observing networks were given to the trainees. Theoretical trainings were carried out by power point presentations and video shows while practical trainings were carried out on operational systems.

The courses were organized and completed successfully in all steps as planned. Upon completion of the course, in general;

***Trainees have;***

- a) comprehended why we need more reliable, more accurate and continuous meteorological data and how these requirements can be met,
- b) learned basic principles and approach of an AWOS and a WEATHER RADAR which have become a necessity for the meteorological observations and meteorological services provided for the users,
- c) took the opportunity to inspect an operational AWOS and WEATHER RADAR and to make practical applications on them,
- d) got the view how to maintain an AWOS and WEATHER RADAR and, networks as well.

***Trainers have;***

- a) comprehended weak and strong parts of their knowledge and teaching method,
- b) learned how they can transfer their knowledge to the trainees,
- c) took the opportunity to check their system's features once more under the inspection and questions of the trainees,
- d) got comments, experiences and recommendations of the trainees.

## **2. TRAINING COURSES ORGANIZED IN TURKEY**

The following international and national training courses were held in Ankara, Alanya, Akçakoca and Balıkesir Facilities of WMO Regional Meteorological Training Centres in Turkey.

### **A) International Training Courses**

#### **1. Training course on automated weather observing systems/2005**

A training course on Automated Weather Observing Systems was planned to be held by Turkish State Meteorological Service within the scope of the tasks of Expert Team on Training Materials and Training Activities established by CIMO Management Group. Training course was held in Alanya Facilities of WMO Regional Meteorological Training Centre in Turkey from 6 to 10 June 2005.

#### **Participants:**

TSMS invited trainees from 21 member countries of WMO and, 12 of them, Azerbaijan, Bosnia-Herzegovina, Georgia, Kazakhstan, Lithuania, Republic of Macedonia, Romania, Russian Federation, Saudi Arabia, Syrian Arab Republic, Turkmenistan and Uzbekistan participated in the course.

#### **Lecturers:**

The lectures were given by the following lecturers of TSMS who participated in the training courses received within the scope of the project of training of trainers:

1. Ercan BÜYÜKBAŞ (*Electronics Engineer, BSc; Manager of Electronic Observing Systems Division*)
2. Levent YALÇIN (*Agricultural Engineer, MSc; Engineer in Electronic Observing Systems Division*)
3. Zafer Turgay DAĞ (*Electronics Engineer, MSc; Engineer in Electronic Observing Systems Division*)
4. Soner KARATAŞ (*Electronics Engineer, BSc; Deputy Meteorological Expert in Electronic Observing Systems Division*)

#### **Course Content:**

Course program was prepared to give a general view and information about the necessity and importance of the meteorological observations, the basic features of Automated Weather Observing System (AWOS) and why and how to operate an AWOS network.

Training course was carried out as 7 (seven) separate modules and training materials have been prepared as a set of 7 (seven) separate modules accordingly. Although course and materials are composed of separate components, the modules are directly related to each other for completion of the topics covered by training course and supplement each other.

The training documents have been prepared by reviewing the WMO publications, existing documents of the manufactures, user guides and the other documents available. On the other hand, a lot of useful information has been provided from the internet. In addition, training documents prepared for the training courses of “training of trainers project for TSMS’ staff” and lecture notes are the other important sources of those training documents. All training documents and lecture notes have been prepared both as hardcopy and softcopy and provided to all trainees. On the other hand, pictures and videos of training activities have also been prepared and provided to the trainees at the end of the course.

The training course is composed of following modules:

- A:** Introduction to AWOS
- B:** Measuring Principles of the Sensors Installed in an AWOS
- C:** Data Collection and Communication
- D:** Data Processing and Monitoring
- E:** Maintenance and Troubleshooting
- F:** Quality Management of AWOS network.
- G:** Experiences of TSMS on operation of AWOS network

The basic topics covered by those modules are as follows:

Introduction to observing systems; Why do meteorological services need AWOS?; Measuring principles of meteorological parameters by using electronic devices; Data acquisition system; Communication and data transfer; Data processing system; Maintenance and technical service; Troubleshooting by simulating failures on the systems; Quality control and quality management in AWOS network; Experiences of TSMS for operating the AWOS network; Facilities and features of AWOS network operated by TSMS

In addition to theoretical part, practical training was given on AWOSs in Alanya station and Antalya international airport station.

### Accommodation and Social Activities:

All local transfers were organized very well by RMTC Coordinator and performed perfectly by RMTC team of TSMS. Full board accommodation was applied for all participants and open buffet breakfast, lunch and dinner were served. Excursions and social activities were organized very well by following the training program. A very famous and well preserved ancient theatre, Aspendos, was visited on the way to Antalya airport for practical training on aviation AWOS. A very enjoyable boat tour and a half day trip to visit Alanya Castle, Dim River and Dim Cave were organized for the participants. Partial financial contribution of WMO is highly appreciated for performing all these works.

### Course evaluation:

To be able to get the views and opinions of the trainees for improving the future training programs, an evaluation questionnaire was delivered to the trainees. The replies showed us that training course has been completed very efficiently and successfully. The satisfied evaluation results are presented below with the original comments and statements of the participants:

|  |
|--|
| <b>Training Course on<br/>“Automated Weather Observing Systems”<br/>06-10 June 2005<br/>WMO RMTC-Turkey<br/>Alanya Facilities, Antalya, TURKEY</b> |
|--|

#### COURSE EVALUATION FORM

#### EVALUATION RESULTS

**AVERAGE    9,51**

|  |
|--|
| <i>The following questionnaire is intended to improve the quality of our future courses.</i> |
|--|

| <i>Please indicate your specific rating of the following aspects of this course</i> |             | <i>(Very Bad)</i>  | <i>(Excellent)</i> |   |   |   |   |   |   |    |   |   |    |  |   |   |   |   |   |   |   |   |   |   |    |
|---|-------------|--|--------------------|---|---|---|---|---|---|----|---|---|----|--|---|---|---|---|---|---|---|---|---|---|----|
| <b>1) Quality of the Course (In General)</b>  | <b>9,33</b> | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0                  | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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| <b>a) Course Programme (Content, Timing, Orientation, etc.)</b>                     | <b>9,44</b> | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0                  | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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| <b>b) Modules (Content, Sufficiency, Timing, etc.)</b>                              | <b>9,44</b> | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0                  | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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| <b>c) Lecturers (Knowledge, English, Presentation, Timing, etc.)</b>                | <b>8,44</b> | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0                  | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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| <b>d) Classroom (Comfort, Facilities, etc.)</b>                                     | <b>9,67</b> | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0                  | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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| <b>e) Materials (Computers, Brochures, CDs, etc.)</b>                               | <b>9,67</b> | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0                  | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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| <b>2) Quality of the Organisations (In General)</b>                                 | <b>9,69</b> | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0                  | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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| <b>a) Transportation (Timing, Comfort, etc.)</b>                                    | <b>9,22</b> | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0                  | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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| <b>b) Accommodation (Comfort, Cleaning, Facilities, etc.)</b>                       | <b>9,89</b> | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0                  | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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|   |             |   |   |   |   |   |   |   |   |   |   |    |
|---|-------------|---|---|---|---|---|---|---|---|---|---|----|
| c) Meals (Taste, Variety, Cleaning, Presentation, etc.)             | <b>9,67</b> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| d) Social Events (Orientation, Sufficiency, Variety, Quality, etc.) | <b>9,78</b> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| e) Staff (Approach, Assistance, Quality, etc.)                      | <b>9,89</b> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

**3) Which aspect of the course did you enjoy most?**

- *Technical aspects*
- *Data processing systems*
- *Practical lectures were more attractive*
- *All aspects of training were perfect*
- *Organization*
- *A lot of information, excellent materials, perfect training centre*
- *Everything was perfect*

**4) Which aspect of the course would you change for the next time?**

- *I would connect PCs to AWOS*
- *I would concentrate on maintenance*
- *I would change break time and lectures period*
- *I would prefer more practical training*
- *I would not change anything, everything was perfect*
- *I would change lecture periods to be able to give more chance to the trainees to study the lecture notes and participate the lectures more actively*
- *Duration of the course was short. It would be 10 days instead of 5 days.*

**5) Any other remark?**

- *Lecturers could be more active and flexible (free from lecture notes) in the lecture room. Thank you for everything.*
- *There is no important thing to add. Thank you.*
- *It was a training course in which education and social activities combined perfectly. Thank you.*
- *Thank you all. Everything was perfect.*
- *I would like to have a training course on technical service and maintenance. Thank you for everything.*

**2. Training course on weather radars/2005**

A training course on Weather Radars was planned to be held by Turkish State Meteorological Service within the scope of the tasks of Expert Team on Training Activities and Training Materials established by CIMO Management Group. Training course was held in Alanya Facilities of WMO Regional Meteorological Training Centre-Turkey from 12 to 16 September 2005.

**Participants:**

TSMS invited trainees from 27 member countries of WMO and, 7 of them, Azerbaijan, Bosnia-Herzegovina, Georgia, Republic of Macedonia, Republic of Moldova, Senegal, Uzbekistan participated in the course. Together with two trainees from Turkey, total 9 (nine) trainees were given the training course.

On the other hand, weather radar manufacturers, (Baron Services/USA; EEC/USA; Gematronik/Germany; Metstar/Public Republic of China; Mitsubishi/Japan; Radtec/USA-Esdas/Turkey; Vaisala/Finland) were also invited to present features of their products and the recent developments in weather radar technology. All of the manufacturers responded very kindly and accepted that invitation. Some of them (EEC/USA; Gematronik/Germany; Metstar/Public Republic of China; Radtec/USA-Esdas/Turkey; Vaisala/Finland) sent their experts to Alanya to give presentations on particular topics. The others could not attend due to some reasons. A presentation time of 45 minutes was allocated for each manufacturer after the end of the normal session of the lecture days. The trainees were asked about their comments about the participation and the presentations of the manufacturers and all of the participants declared that such applications would be very useful because of having a rare opportunity to discuss some issues with the experts face to face and to be able to follow the new products and features developed by the manufacturers.

#### **Lecturers:**

The lectures were given by the following lecturers of TSMS who participated in the training courses received within the scope of the project of training of trainers:

1. Ercan BÜYÜKBAŞ(*Electronics Engineer, Manager of Electronic Observing Systems Division*)
2. Oğuzhan ŞİRECİ (*Electronics Engineer, Chief Engineer in Electronic Observing Systems Division*)
3. Aytaç HAZER (*Electronics Engineer, Engineer in Electronic Observing Systems Division*)
4. Cüneyt GEÇER (*Meteorological Engineer, Deputy Manager of Remote Sensing Division*)
5. İsmail TEMİR(*Mechanical Engineer, Engineer in Electronic Observing Systems Division*)

#### **Course Content:**

The training course and training documents prepared are intended to give a general information on radar theory, weather radars and meteorological applications, to highlight the important topics, to summarize the critical aspects by reviewing the information and comments from different sources and to provide some vital information why and how to install and operate a weather radar network.

Training course was organized as 6 (six) separate modules and training materials have been prepared as a set of 6 (six) separate modules. But the modules are directly related to each other for completion of the topics covered by training course and supplement each other. The training documents have been prepared by reviewing the WMO publications, the popular radar books and the other documents available. On the other hand, a lot of useful information has been provided from the internet. TSMS received very effective training courses from the radar manufacturers who supplied the existing radars operated by TSMS. Training documents prepared during those courses and notes from the lectures are the other important sources of those training materials. Radar manufacturer's demonstration and power point presentations by experts have also been taken into consideration while preparing the documents.

All lectures notes have been prepared both as hardcopy and softcopy and provided to all trainees. On the other hand, pictures and videos of training activities have also been prepared and provided to the trainees at the end of the course.

The training course is composed of following modules:

- A:** Introduction to RADAR
- B:** Radar Hardware
- C:** Processing Basics in Doppler Weather Radars
- D:** Radar Products and Operational Applications
- E:** Radar Maintenance and Calibration Techniques
- F:** Radar Infrastructure

The basic topics covered by those modules are as follows:

Radar Theory; Propagation of EM waves; Radar Types; Operation Principles of Weather Radar; Antenna, Transmitter, Receiver, Radar Control Processor(RCP) and Radar Signal Processor(RSP); Radome; Signal Processing; Maximum Unambiguous Range; Velocity Determination; Doppler Dilemma; Radar Range Folding; Velocity Folding; Radar Products; Radar Product Applications; Maintenance Types and Procedures; Common Tools Used for Radar Maintenance; Measurements on Transmitter; Bite System- Maintenance Software; Calibration; Corrective Maintenance Samples; Radar Site Selection Criteria; Radar Site Infrastructure Requirements

**Accommodation and Social Activities:**

All local transfers were organized very well by RMTC Coordinator and performed perfectly by RMTC team of TSMS. Full board accommodation was applied for all trainees and open buffet



breakfasts, lunches and dinners were served. Excursions and social activities were organized very well by following the training program. A very enjoyable boat tour and a half day trip to visit Alanya Castle, Dim River and Dim Cave were organized for the participants. Partial financial contribution of WMO is highly appreciated for performing all these works.

**Course evaluation:**

To be able to get the views and opinions of the trainees an evaluation questionnaire was delivered to the trainees. The replies show that training course has been completed very efficiently and successfully. The satisfied evaluation results are presented below with the original comments and statements of the participants:

**Training Course on  
“Weather Radars”  
12-16 September 2005  
WMO RMTC-Turkey  
Alanya Facilities, Antalya, TURKEY**

**COURSE EVALUATION FORM**

**EVALUATION RESULTS**

**AVERAGE 9,84**

*The following questionnaire is intended to improve the quality of our future courses.*

| <i>Please indicate your specific rating of the following aspects of this course</i> | <i>(Very Bad)</i> | <i>(Excellent)</i>   |   |   |   |   |   |   |   |    |   |   |    |
|---|-------------------|--|---|---|---|---|---|---|---|----|---|---|----|
| <b>1) Quality of the Course (In General)</b>  | <b>9,80</b>       | <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> </table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
| 0   | 1                 | 2  | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |   |   |    |
| a) Course Programme (Content, Timing, Orientation, etc.)                            | <b>9,89</b>       | <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> </table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
| 0   | 1                 | 2  | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |   |   |    |
| b) Modules (Content, Sufficiency, Timing, etc.)                                     | <b>9,78</b>       | <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> </table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
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| c) Lecturers (Knowledge, English, Presentation, Timing, etc.)                       | <b>9,78</b>       | <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> </table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
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| d) Classroom (Comfort, Facilities, etc.)  | <b>9,78</b>       | <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> </table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
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| e) Materials (Computers, Brochures, CDs, etc.)                                      | <b>9,78</b>       | <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> </table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
| 0   | 1                 | 2  | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |   |   |    |
| <b>2) Quality of the Organisations (In General)</b>                                 | <b>9,87</b>       | <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> </table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
| 0   | 1                 | 2  | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |   |   |    |
| a) Transportation (Timing, Comfort, etc.)   | <b>9,78</b>       | <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> </table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
| 0   | 1                 | 2  | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |   |   |    |
| b) Accommodation (Comfort, Cleaning, Facilities, etc.)                              | <b>9,78</b>       | <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> </table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
| 0   | 1                 | 2  | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |   |   |    |
| c) Meals (Taste, Variety, Cleaning, Presentation, etc.)                             | <b>10,00</b>      | <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> </table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
| 0   | 1                 | 2  | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |   |   |    |
| d) Social Events (Orientation, Sufficiency, Variety, Quality, etc.)                 | <b>10,00</b>      | <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> </table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
| 0   | 1                 | 2  | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |   |   |    |
| e) Staff (Approach, Assistance, Quality, etc.)                                      | <b>9,78</b>       | <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center;"> <tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> </table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
| 0   | 1                 | 2  | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |   |   |    |

- 3) Which aspect of the course did you enjoy most?**
- *Maintenance*
  - *They are all good.(and I enjoy them all.)*

- *Id, 2a(classroom, transportation)*
- *Lecturers and presentation*
- *Lectures*
- *Introduction to radar, radar hardware, processing basics in doppler weather radars and other*
- *Meeting other countries' people and to communicate with them. About radar we have beneficial information.*
- *Radar products.*

4) Which aspect of the course would you change for the next time?

- *More practice*
- *None*
- *Everything was very well but the duration of the course could be a bit longer*
- *Not change.*

5) Any other remark?

- *Thank you for your organization.*
- *Thank you.*
- *It was a great training course and we all have a good time*
- *I want to thank you for inviting me in your country also for the courses, I've learned a lot of radars. It was the great course and not only the course.*
- *Very nice training course*

### **3. Training course on automated weather observing systems and weather radars/2006**

A training course composed of two parts, Automated Weather Observing Systems (AWOS) and Weather Radars, was planned to be held by Turkish State Meteorological Service within the scope of the tasks of Expert Team on Training Activities and Training Materials established by CIMO Management Group. The first part of the training course was held in Alanya Facilities of WMO Regional Meteorological Training Centre-Turkey from 06 to 15 June 2006 with the participation of all trainees. Second part of the training course was held in İstanbul radar site and in AWOS stations in Ankara just for the trainees from United Arab Emirates in accordance with the particular request for a detailed hands-on training on the systems coming from the Meteorology Department of Air Force and Air Defence of United Arab Emirates.

#### **Participants:**

TSMS invited trainees from 25 member countries of WMO and, 8 of them, Bosnia-Herzegovina, Bulgaria, Georgia, Kazakhstan (2-trainee), Lithuania, Republic of Macedonia, United Arab Emirates(4-trainee), Uzbekistan participated in the course. Together with one trainee from Turkey, total 13 (thirteen) trainees were given the training course.

#### **Lecturers:**

The lectures were given by the following lecturers of TSMS who participated in the training courses received within the scope of the project of training of trainers:

1. Ercan BÜYÜKBAŞ (*Electronics Engineer, BSc; Manager of Electronic Observing Systems Division*)
2. Levent YALÇIN (*Agricultural Engineer, MSc; Engineer in Electronic Observing Systems Division*)
3. Soner KARATAŞ (*Electronics Engineer, MSc; Meteorological Expert in Electronic Observing Systems Division*)
4. Aytaç HAZER (*Electronics Engineer, BSc; Engineer in Electronic Observing Systems Division*)
5. İsmail TEMİR (*Mechanical Engineer, BSc; Engineer in Electronic Observing Systems Division*)

**Course Content:**

The course has been organized and applied in four basic steps:

1. Theoretical training on doppler weather radars including radar theory, radar hardware, signal processing, meteorological applications, infrastructure requirements for weather radars and, operation, maintenance and troubleshooting methods of a Weather Radar Network , 6-9 June 2006.
2. Theoretical and practical training on Automated Weather Observing System (AWOS) including site selection and infrastructure, structure and components of an AWOS, measuring principles and sensors, data collection and processing units, quality management, operation, calibration, maintenance and troubleshooting methods of an AWOS network, 12-16 June 2006.
3. Hands-on training on Doppler weather radar in İstanbul radar site including operation principles, test equipments and how to use them, preventive and corrective maintenance on an operational system, 19-23 June 2006.
4. Hands-on training on Automated Weather Observing Systems on operational systems in Ankara including operation principles, test equipments and how to use them, preventive and corrective maintenance on operational systems at the airports and at the synoptic stations, 26-30 June 2006.

The training documents have been re-prepared by reviewing the document prepared for the training courses organized in 2005 and some modifications applied by inserting some new information and corrections.

All lectures notes have been prepared both as hardcopy and softcopy and provided to all trainees. On the other hand, pictures and videos of training activities have also been prepared and provided to the trainees at the end of the course.

The training course is composed of following modules:

- **Lecture Modules for AWOS:**
  - A<sub>A</sub>:** Introduction to AWOS
  - B<sub>A</sub>:** Measuring Principles of the Sensors Installed in an AWOS
  - C<sub>A</sub>:** Data Collection and Communication
  - D<sub>A</sub>:** Data Processing and Monitoring
  - E<sub>A</sub>:** Maintenance and Troubleshooting
  - F<sub>A</sub>:** Quality Management of AWOS network.
  - G<sub>A</sub>:** Experiences of TSMS on operation of AWOS network
  
- **Lecture Modules for Weather Radar:**
  - A<sub>R</sub>:** Introduction to Radar
  - B<sub>R</sub>:** Radar Hardware
  - C<sub>R</sub>:** Processing Basics in Doppler Weather Radars
  - D<sub>R</sub>:** Radar Products and Operational Applications
  - E<sub>R</sub>:** Radar Maintenance and Calibration Techniques
  - F<sub>R</sub>:** Radar Infrastructure

The basic topics covered by those modules are as follows:

**AWOS:**

Introduction to Observing Systems; Why do meteorological services need AWOS?; Measuring principles of meteorological parameters by using electronic devices; Data acquisition system; Communication and Data Transfer; Data Processing System; Maintenance and Technical Service; Troubleshooting by Simulating Failures on The System; Quality Control and Quality Management in AWOS Network; Experiences of TSMS for Operating the AWOS Network; Facilities and Features of AWOS Network Operated by TSMS

## **RADAR:**

Radar Theory; Propagation of EM waves; Radar Types; Operation Principles of Weather Radar; Antenna, transmitter, Receiver, Radar Control Processor(RCP) and Radar Signal Processor(RSP); Radome; Signal Processing; Maximum Unambiguous Range; Velocity Determination; Doppler Dilemma; Radar Range Folding; Velocity Folding; Radar Products; Radar Product Applications; Maintenance Types and Procedures; Common Tools Used for Radar Maintenance; Measurements on Transmitter; Bite System- Maintenance Software; Calibration; Corrective Maintenance Samples; Radar Site Selection Criteria; Radar Site Infrastructure Requirements

## **Accommodation and Social Activities:**

All local transfers were organized very well by RMTTC Coordinator and performed perfectly by RMTTC team of TSMS. Full board accommodation was applied for all trainees and open buffet breakfasts, lunches and dinners were served. Excursions and social activities were organized very well by following the training program. A very famous and well preserved ancient theatre, Aspendos, was visited on the way to Antalya airport for practical training on the aviation AWOS. A very enjoyable boat tour and a half day trip to visit Alanya Castle, Dim River and Dim Cave were organized for the participants, too.

## **Course evaluation:**

To be able to get the views and opinions of the trainees an evaluation questionnaire was delivered to the trainees. The replies show that training course has been completed very efficiently and successfully. The satisfied evaluation results are presented below with the original comments and statements of the participants:

**Training Course on  
“Automated Weather Observing Systems and Weather Radars”  
06-15 June 2006/19-30 June 2006  
WMO RMTTC-Turkey  
Alanya Facilities, Antalya, / İstanbul-Ankara-TURKEY**

**COURSE EVALUATION FORM  
EVALUATION RESULTS  
AVERAGE 9,74**

*The following questionnaire is intended to improve the quality of our future courses.*

| <i>Please indicate your specific rating of the following aspects of this course</i> |             | <i>(Very Bad)</i>  | <i>(Excellent)</i> |   |   |   |   |   |   |    |  |   |   |   |   |   |   |   |   |   |   |    |
|---|-------------|--|--------------------|---|---|---|---|---|---|----|--|---|---|---|---|---|---|---|---|---|---|----|
| <b>1) Quality of the Course (In General)</b>  | <b>9,60</b> | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> |                    |   |   |   |   |   |   |    |  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 0   | 1           | 2  | 3                  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |  |   |   |   |   |   |   |   |   |   |   |    |
| <b>a) Course Programme (Content, Timing, Orientation, etc.)</b>                     | <b>9,70</b> | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> |                    |   |   |   |   |   |   |    |  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
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| <b>b) Modules (Content, Sufficiency, Timing, etc.)</b>                              | <b>9,60</b> | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> |                    |   |   |   |   |   |   |    |  | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 0   | 1           | 2  | 3                  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |  |   |   |   |   |   |   |   |   |   |   |    |

|  |              |  |   |   |   |   |   |   |   |    |   |   |    |
|--|--------------|--|---|---|---|---|---|---|---|----|---|---|----|
| c) Lecturers (Knowledge, English, Presentation, Timing, etc.)  | <b>9,50</b>  | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
| 0  | 1            | 2  | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |   |   |    |
| d) Classroom (Comfort, Facilities, etc.)   | <b>9,80</b>  | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
| 0  | 1            | 2  | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |   |   |    |
| e) Materials (Computers, Brochures, CDs, etc.)   | <b>10,00</b> | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
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| <b>2) Quality of the Organisations (In General)</b>  | <b>9,70</b>  | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
| 0  | 1            | 2  | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |   |   |    |
| a) Transportation (Timing, Comfort, etc.)  | <b>9,70</b>  | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
| 0  | 1            | 2  | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |   |   |    |
| b) Accommodation (Comfort, Cleaning, Facilities, etc.)   | <b>9,70</b>  | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
| 0  | 1            | 2  | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |   |   |    |
| c) Meals (Taste, Variety, Cleaning, Presentation, etc.)  | <b>9,90</b>  | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
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| d) Social Events (Orientation, Sufficiency, Variety, Quality, etc.)  | <b>9,70</b>  | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
| 0  | 1            | 2  | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |   |   |    |
| e) Staff (Approach, Assistance, Quality, etc.)   | <b>10,00</b> | <table border="1"><tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table> | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 | 10 |
| 0  | 1            | 2  | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |   |   |    |
| <b>3) Which aspect of the course did you enjoy most?</b>   |              |  |   |   |   |   |   |   |   |    |   |   |    |
| <ul style="list-style-type: none"> <li>• <i>Awos Station and weather radar course</i></li> <li>• <i>Weather radar-hardware and principles of working, radar equation and parameters</i></li> <li>• <i>I got what I wanted</i></li> <li>• <i>The documentations of the course are very good, they are prepared very usefully</i></li> <li>• <i>The lectures teaching</i></li> <li>• <i>Everything was perfect</i></li> <li>• <i>I enjoyed everything, the staff were really friendly and helpful</i></li> </ul> |              |  |   |   |   |   |   |   |   |    |   |   |    |
| <b>4) Which aspect of the course would you change for the next time?</b>   |              |  |   |   |   |   |   |   |   |    |   |   |    |
| <ul style="list-style-type: none"> <li>• <i>I would like o get more information in weather radar</i></li> <li>• <i>More attention to meteorological aspect of radar observations and applications/products.</i></li> <li>• <i>I would change the timing for travel</i></li> <li>• <i>Maybe the subjects can be divided, I mean separate radar raining and separate AWOS training</i></li> <li>• <i>Automatic weather system</i></li> <li>• <i>Nothing, just do it as you already do.</i></li> </ul>            |              |  |   |   |   |   |   |   |   |    |   |   |    |
| <b>5) Any other remark?</b>  |              |  |   |   |   |   |   |   |   |    |   |   |    |
| <ul style="list-style-type: none"> <li>• <i>I would like to join the course again..</i></li> <li>• <i>Practical demonstration of radar system hardware “on the place” would be favourable. I wish you to support Antalya with a new one as soon as you would be able to do it.</i></li> <li>• <i>No daily cleaning for the accommodation.</i></li> <li>• <i>This was the best opportunity for me to learn electronic observing systems.</i></li> </ul>   |              |  |   |   |   |   |   |   |   |    |   |   |    |

## B) National Training Courses

TSMS carried out four national training courses on observing systems in 2005 and 2006 within the scope of the annual training program prepared in accordance with its general training policy to train its own staff.

### 1. Training courses on automated weather observing systems/2005-2006

Two training courses in 2005 and one training course in 2006 were organized on automated weather observing systems in Ankara and Akçakoca Facilites of WMO Regional Meteorological Training Centres. One training course is planned to carry out in Ankara in November 2006, too.

**Participants:**

The training courses were given to the staff employed in the regional offices of TSMS, who are responsible either for operating the systems or for making the maintenance of the systems. Furthermore, the trainees from some other national organizations which use some meteorological instruments and observing systems were also invited to participate in the course and those were given training, too. Total 101 trainees (93 from regional offices and 8 from other organizations) were trained and certified after those courses.

**Lecturers:**

The lectures were given by the following lecturers of TSMS who participated in the training courses received within the scope of the project of training of trainers:

1. Yücel YÜCE (*Technical Teacher; Manager of Observing Control Division*)
2. Levent YALÇIN (*Agricultural Engineer, MSc; Engineer in Electronic Observing Systems Division*)
3. Soner KARATAŞ (*Electronics Engineer, MSc; Meteorological Expert in Electronic Observing Systems Division*)
4. Zafer Turgay DAĞ (*Electronics Engineer, MSc; Engineer in Electronic Observing Systems Division*)
5. Müslüm YİĞİT (*Mechanical Engineer, BSc; Engineer in Electronic Observing Systems Division*)
6. Faruk ÇİÇEK (*Electronics Engineer, MSc; Engineer in Electronic Observing Systems Division*)
7. Yusuf Özcan CANDEMİR (*Electronics Engineer, BSc; Engineer in Electronic Observing Systems Division*)
8. Fazlı ERGÜN (*Electronics Engineer, BSc; Engineer in Electronic Observing Systems Division*)
9. Salih ÇAKIL (*Electronics Teacher; Maintenance Staff in Electronic Observing Systems Division*)
10. Ercan KARAKOÇ (*Food Processing Engineer, BSc; Observing Control Division*)
11. Özden TÜTEN (*Agricultural Engineer, BSc; Observing Control Division*)

**Course Content:**

The training course and training documents prepared are intended to give a general information on automated weather observing systems used by TSMS and how to operate the systems. All lectures

notes have been prepared both as hardcopy and softcopy and provided to all trainees. On the other hand, pictures and videos of training activities have also been prepared and provided to the trainees at the end of the course.

Following basic topics were studied during the courses:

Importance of meteorological observations; Site selection for observing; Presentation of the instruments needed in an observing station; Why and how to use AWOS; Basic principles of AWOS; Data Collection Unit (DCU-data logger); Sensors in an AWOS; The application software used in the AWOS network of TSMS; User applications, generating the products; How to maintain the system

## **2. Training course on weather radars/2006**

A training course on maintenance of weather radars was carried out in Balıkesir Training Centre of TSMS from 24 to 28 April, 2006.

### **Participants:**

The training courses were planned to train the staff employed in the regional offices of TSMS, who are responsible for making the preventive maintenance and first aid action of the radars operated by TSMS. Total 8 trainees were trained and certified after the completion of the course.

### **Lecturers:**

The lectures were given by the following lecturers of TSMS who participated in the training courses on weather radars received within the scope of the project of training of trainers:

1. Cihan GÖZBÜYÜK (*Electronics Engineer, BSc; Meteorological Expert in Electronic Observing Systems Division*)
2. Mesut Kemal AYDIN (*Mechanical Engineer, BSc; Engineer in Electronic Observing Systems Division*)
3. Abdurrahman MACİT (*Electronics Technician; Maintenance Staff in Electronic Observing Systems Division*)

### **Course Content:**

The training course and training documents prepared are intended to give a general information on weather radars used by TSMS and how to operate the systems. The lecturers took the opportunity to transfer their knowledge and experiences to the technicians of regional directorates. All lectures notes have been prepared both as hardcopy and softcopy and provided to all trainees. On the



other hand, pictures and videos of training activities have also been prepared and provided to the trainees at the end of the course.

The training was held as 2-day theoretical and 3-day practical training on the radar operated in Balıkesir and following basic topics were studied during the course:

History of Radar; Basic Principles of Radar Working; Main Equipments of Weather Radar; Radar Infrastructures; Methods of Corrective and Preventive Maintenance on Weather Radars; How the system works; How to maintain each component of radar system.

### **3. CONCLUSION**

Training is an essential and indispensable issue with a vital importance for improving and maintaining any application and any action, observing systems and observations as well. To organize such training courses is very important and beneficial for building the capacity of member countries of WMO. Furthermore, exchanging the experiences with the other countries is getting more important for operating the observing network smoothly.

It is also very important to give a chance to the experts from different countries to come together for discussing many issues and sharing their experiences. So, these training courses should be organized regularly and number of the participants should be increased.

Furthermore, contents of the short term trainings can be focused on particular topics, e.g. visibility measurement, and trainees can learn much by concentrating on a certain subject.

On the other hand, to use RMTCs in different countries for such activities gives an opportunity to the trainees to establish personnel relations and friendship and to learn something about different cultures of the member countries of WMO. We believe that these personnel relations may help member countries to come closer for developing institutional relations and to understand and help each other.

It is very obvious that national and international training activities should be supported and encouraged to be able to bring the community of meteorology to a common service level and to maintain it.

One of the important issues to be needed to highlight is the contribution of the manufacturers if they participate in such training activities as we did in our weather radar training. The experts of the manufacturers and the users of the systems can come together with those activities to discuss on

particular topics. So such applications should also be supported and encouraged.

We are aware that, as being our first training courses and first training documents regarding observing systems in English, those training documents, most probably, will be in need of reviewing and modifying in some topics. Whoever makes any comment, recommendations and corrections which will pave our way for further activities by making invaluable contributions will be highly appreciated.

Turkish State Meteorological Service intends to continue its training program and to keep on supporting the training activities of CIMO as well as the other WMO activities. It is planned that those training courses will be organized every year and will become traditional training courses on meteorological instruments to be organized in Turkey.

It is believed that to arrange such training courses regularly every year by reviewing and updating the training subjects and improving the training level will be very beneficial for both Turkish State Meteorological Service and meteorological institutions of the other countries.

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**Some pictures from course activities:**



