

# ***THUNDERSTORM AREA DETECTION***

## **A NEW GROUND BASED WEATHER RADAR REPORT FOR AERONAUTICAL PURPOSE**

**EUROCONTROL Workshop on MET support to ATM  
Brussels, 27<sup>th</sup>-28<sup>th</sup> May 2009**



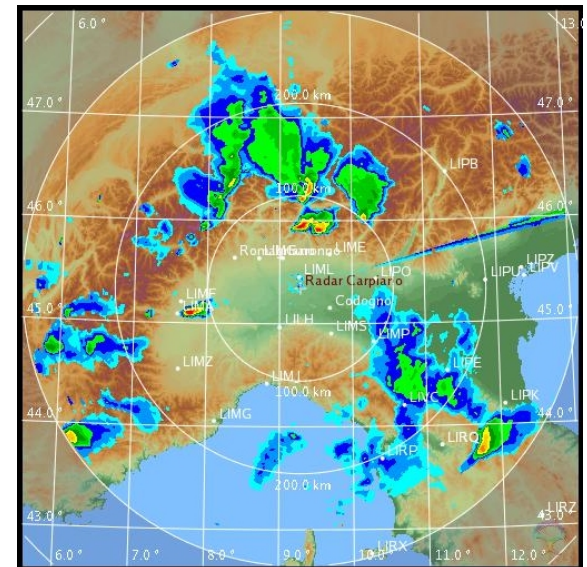
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## FOREWORD

- For a better displacement of ground based weather radar information inside (ATC units) and outside (operators and flight crew members) ENAV S.p.A., the Meteorological Department of ENAV S.p.A. introduced (first issue on Monday, 9th March 2009) a new kind of weather radar report, for reporting information derived from its own ground weather radar of Rome Fiumicino and Milan Linate.

### **TAD (THUNDERSTORM AREA DETECTION)**

LIML MET RADAR 15 031400/031500Z HVY  
OCNL ECHOES AREA RAD050KM TS 09DEG  
51MIN E 46DEG 13MIN N TOP 8000M STNR  
WKN ./ HVY ISOL ECHO RAD030KM TS OVER  
MEDAM TOP 11000M MOV E 13M/S NC=



## THUNDERSTORM AREA DETECTION CODE

The new report provides the following elements:

- ICAO reporting station code and sequence number;
- validity;
- echo intensity;
- echo extension;
- associated phenomena (present weather);
- echo position;
- top of clouds;
- movement forecast;
- intensity forecast;
- remark.

## THUNDERSTORM AREA DETECTION CODE

### 1. ICAO reporting station code and sequence number

**LIRF MET RADAR XX**

**LIML MET RADAR XX**

- This group shall always be included in any report; sequence numbers (two digits: for example 01 for report number 1) start at 00.00 UTC and end at 23.59 UTC.
- Any report shall be referred to a circular area, radius of 150 km, centred on the airport issuing the report.

### 2. Validity

**GGHHMM/IGGHHMMZ**

- reported in day and UTC time. Shall be no less than one hour and no more than three hours (except for what stated in section 11).
- This group shall always be included in any report. Starting time validity shall be understood as “time of observation”, while the validity period shall be referred to the forecasts of “movement” and “intensity” (see section 9 and 10).
- No more than one report for each station shall be present at any given time.

## THUNDERSTORM AREA DETECTION CODE

### 3. Echo intensity

feeble	<b>FBL</b>	< 20 dBz
moderate	<b>MOD</b>	from 20 to 35 dBz
mod/heavy	<b>MOD/HVY</b>	from 35 to 55 dBz
heavy	<b>HVY</b>	> 55 dBz

- In the event of a single echo, intensity shall be understood as the maximum intensity of the echo itself; in the event of an area or a line of echoes, intensity shall be understood as the maximum intensity inside the area or along the line.

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### 4. Echo extension

- **ISOL ECHO RAD XXXNM (XXX KM)**  
single echo, having a radius of XXX nautical miles (or XXX kilometres);
- **ISOL ECHOES AREA RAD XXXNM (XXX KM)**  
echoes covering less than 50% of a circular area, having a radius of XXX nautical miles (or XXX kilometres);
- **OCNL ECHOES AREA RAD XXXNM (XXX KM)**  
echoes covering from 50% to 75% of a circular area, having a radius of XXX nautical miles (or XXX kilometres) ;
- **FRQ ECHOES AREA RAD XXXNM (XXX KM)**  
echoes covering more than 75% of a circular area, having a radius of XXX nautical miles (or XXX kilometres) ;
- **CNS ECHOES LINE WID XXXNM (XXX KM)**  
a continuous line of echoes (or echoes displayed as not to be reported divided into different areas), having a thickness of XXX nautical miles (or XXX kilometres)
- Radius or thickness shall always be reported with three digits (e.g.: 005KM for a radius of 5 kilometres) and be always followed by the relative unit (**NM** or **KM**).

## THUNDERSTORM AREA DETECTION CODE

### 5. Present weather

- This group should always be included in any report; its absence shall be understood as in consequence of the impossibility of its identification. Present weather shall be reported using the following abbreviation (or combination thereof):
  - i. **RA** rain
  - ii. **GR** hail
  - iii. **SN** snow
- Reporting of the phenomena should be preceded, if appropriate, by the qualifier **SH** (shower) or **TS** (thunderstorm). Qualifier **TS**, used when detecting the presence of electrical activity, should also by itself, when no precipitations are detected.

## THUNDERSTORM AREA DETECTION CODE

### 6. Echo position

- This group shall always be included in any report. Echo position shall be reported using one of the following statements:
  - geographical locations
  - geographical coordinates
- Geographical locations: common names (also in plain language) or ATC significant points and radio navigation aids, using one of the eight points of compass (**N, NE, E, SE, S, SW, W, NW**) or **OVER** in order to specify:
  - i. position of the centre of the echoes area or of the single echo;
  - ii. positions of the extremities of the line, in the event of echoes displayed in a continuous band, using the statement:  
**FM** *location name* **TO** *location name*

## THUNDERSTORM AREA DETECTION CODE

### 6. Echo position

- Geographical coordinates: in the sequence “latitude and longitude” or “longitude and latitude”, using centesimal degrees (degrees, tenths and hundredths of degree) or sexagesimal degrees (degrees and minutes), in order to specify:
  - i. position of the centre of the echoes area or of the single echo;
    - a. **XXDEG YYMIN N XXDEG YYMIN E**
    - b. **XX.xxDEG N XX.xxDEG E**
    - c. **XXDEG YYMIN E XXDEG YYMIN N**
    - d. **XX.xxDEG E XX.xxDEG N**
  - ii. positions of the extremities of the line, in the event of echoes displayed in a continuous band
    - a. **FM XXDEG YYMIN N XXDEG YYMIN E TO XXDEG YYMIN N XXDEG YYMIN E**
    - b. **FM XX.xxDEG N XX.xxDEG E TO XX.xxDEG N XX.xxDEG E**
    - c. **FM XXDEG YYMIN E XXDEG YYMIN N TO XXDEG YYMIN E XXDEG YYMIN N**
    - d. **FM XX.xxDEG E XX.xxDEG N TO XX.xxDEG E XX.xxDEG N**

## THUNDERSTORM AREA DETECTION CODE

### 7. Top of clouds

- This group shall always be included in any report. Used for reporting the maximum top of the echo (or the maximum top into the echoes area) in feet or meters, using the statement:

**TOP XXXXXFT (XXXXXM)**

- The value shall be always followed by the related unit (**FT** or **M**), considering the number of digits variable as necessary (for example: 8000M, 12000M or 20000FT).

## THUNDERSTORM AREA DETECTION CODE

### 8. Movement

- This group should always be included in any report; its absence shall be understood as a consequence of the impossibility of its identification. Used for reporting a forecast about the direction and speed of the echo (or of the entire echoes area) movements or the absence of movements, within the validity period of the radar report. Movement shall be reported using one of the following statements:
  - i. **MOV DD XXKT (XXMPS)**  
using one of the eight points of compass (**N, NE, E, SE, S, SW, W, NW**) in order to report the direction of movement, followed by velocity in knots **KT** or meters/seconds **MPS**). Direction of movement should also be reported without any velocity data, in the impossibility of its identification;
  - ii. **STNR**  
for reporting a stationary condition.
- Velocity shall always be reported with two digits (e.g.: 05KT for reporting a velocity of 5 knots) and be always followed by the related unit (**KT** or **MPS**).

## THUNDERSTORM AREA DETECTION CODE

### 9. Intensity

- This group should always be included in any report; its absence shall be understood as in consequence of the impossibility of its identification. Used for reporting a forecast about the intensity of the echo (or of the entire echoes area), relating to the validity period of the radar report. Intensity shall be reported using one of the following statements:
  - i. **INTSF** intensifying
  - ii. **WKN** weakening
  - iii. **NC** no change

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### 10. REMARK

- In the event of a report issued for amending the previous one during its validity time, the amended report shall be cancelled, appending to the new report the statement:

**RMK CNLXX**

where *XX* is the progressive number of the cancelled report.

- In this case, the presence of the remark group shall be considered mandatory.

# THUNDERSTORM AREA DETECTION CODE

## 11. Special issue

- **ECNIL**

For reporting “no echoes detected”. In this case, the validity of the report should be extended up to six hours.

- **MAINT NOTAM XXXX**

In the event of radar report not available due to maintenance or for any other circumstance as reported in a specific NOTAM. In this case, the validity of the report should be extended as to cover the entire NOTAM validity. NOTAM number shall be appended to the report.

- **NA**

Radar report not available (any other circumstance not included in the previous item)

## TAD examples

```
ZCZC MD3427  
FF LIIBAOIS  
111238 LIRFMYX  
SDIY61 LIRF 111238  
TAD  
LIRF MET RADAR 10 VALID 111300/111500Z BKN ECHOES LINE WID 020KM FM  
43DEG 55MIN E 12DEG 54MIN N TO 42DEG 57MIN E 13DEG 88MIN N TOP 7000M  
INTST NC=  
NNNN
```

\*Tad\*

LIRF MET RADAR 01 VALID 120200/120500Z ECNIL=  
LIRF MET RADAR 16 VALID 112300/120200Z ECNIL=  
LIRF MET RADAR 15 VALID 112100/112300Z HVY ISOL ECHOES RAD 010KM  
TSRA OVER PONZA TOP 7000M WKN=  
LIRF MET RADAR 14 VALID 112010/112100Z MOD CNS ECHOES LINE WID 010KM  
FM 11.63E 41.68N TO 12.61E 41.33N TOP 5000M MOV S 10KT WKN=  
LIRF MET RADAR 14 VALID 112010/112100Z MOD CNS ECHOES LINE WID 010KM  
FM 11.63E 41.68N TO 12.61E 41.33N TOP 5000M MOV S 10KT WKN=  
LIRF MET RADAR 13 VALID 111900/112000Z MOD/HVY CNS ECHOES LINE WID  
010KM TSRA FM 11.63E 42.04N TO 12.71E 41.36N TOP 6000M MOV S 15KT  
WKN=  
LIRF MET RADAR 12 VALID 111700/111900Z OCNL ECHOES AREA RAD 030KM  
MOD/HVY TS 12.66 E 42.23 N TOP 6000M MOV S WKN=  
LIRF MET RADAR 11 VALID 111500/111700Z SCT ECHOES LINE MOD WID 020KM  
FM 12.16E 42.79N TO 14.04E 41.48N TOP 7000M STNR INTST NC=  
LIRF MET RADAR 10 VALID 111300/111500Z BKN ECHOES LINE WID 020KM FM  
43DEG 55MIN E 12DEG 54MIN N TO 42DEG 57MIN E 13DEG 88MIN N TOP 7000M  
INTST NC=  
LIRF MET RADAR 09 VALID 111100/111400Z ECNIL=  
LIRF MET RADAR 08 VALID 110900/111100Z ECNIL=

## More...

- More details about TAD code form and all information related to the new report are given in the **AIC A13/2008**, published by ENAV S.p.A. on 4<sup>th</sup> December 2008.
- AIC is available here or via email at [marco.tadini@enav.it](mailto:marco.tadini@enav.it)



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AIC  
A 13/2008  
4 DEC

### A13 GEN ITALIA

#### 1. TAD (THUNDERSTORM AREA DETECTION) – RIPORTO DI OSSERVAZIONE A FINI AERONAUTICI DA RADAR METEO DI SUPERFICIE

A partire da lunedì 9 marzo 2009, le Unità di Previsione Meteorologica ENAV S.p.A. di Roma Fiumicino e Milano Linate emetteranno un nuovo formato di rapporto radar meteorologico, a seguito di attività di osservazione di superficie.  
Il nuovo rapporto, denominato TAD (Thunderstorm Area Detection), contiene i seguenti elementi:

- identificativo ICAO di stazione emittente e numero progressivo di emissione;
- validità;
- intensità dell'eco;
- estensione dell'eco;
- fenomeni associati;
- posizione dell'eco;
- top delle nubi;
- movimento;
- variazione di intensità;
- remark.

#### 2. Identificativo ICAO di stazione emittente e numero progressivo di emissione

LIRF MET RADAR XX  
LIML MET RADAR XX

Il dato è obbligatorio; la numerazione progressiva (a due cifre: per esempio 01 per indicare il rapporto n.1) inizia alle 00.00 UTC e termina alle 23.59 UTC.  
Il messaggio deve riferirsi ad un'area circolare di 150 km, centrata sull'aeroporto che emette il rapporto.

#### 3. Validità

VALID G-GHHMM/M/G-GHHMMZ

espressa in giorno, ora e minuti UTC.

Il dato è obbligatorio. L'ora di inizio validità dovrà essere intesa come "ora di osservazione", mentre il periodo di validità dovrà essere inteso come riferito alla previsione di "movimento" e di "variazione di intensità" (vedi punti 9 e 10).  
In ogni istante dovrà comunque esserci un solo rapporto radar in corso di validità per ciascuna stazione emittente (Roma Fiumicino e Milano Linate).

#### 4. Intensità dell'eco

Il dato è obbligatorio. L'eco dovrà essere classificata di intensità:

- |                        |         |
|------------------------|---------|
| a. debole              | FBL     |
| b. moderata            | MOD     |
| c. da moderata a forte | MOD/HVY |
| d. forte               | HVY     |

### A13 GEN ITALY

#### 1. TAD (THUNDERSTORM AREA DETECTION) – GROUND BASED WEATHER RADAR REPORT FOR AERONAUTICAL PURPOSE

Starting from Monday 9<sup>th</sup> March 2009, ENAV S.p.A. Forecasting Centres of Rome Fiumicino and Milan Linate will issue a new kind of report, following ground based weather radar observations.

The new report, called TAD (Thunderstorm Area Detection), provides the following elements:

- ICAO reporting code and sequence number;
- validity;
- echo intensity;
- echo extension;
- associated phenomena (present weather);
- echo position;
- top of clouds;
- movement forecast;
- intensity forecast;
- remark.

#### 2. ICAO reporting station code and sequence number

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LIML MET RADAR XX

This group shall always be included in any report; sequence numbers (two digits: for example 01 for report number 1) start at 00.00 UTC and end at 23.59 UTC.  
Any report shall be referred to a circular area, radius of 150 km, centred on the airport issuing the report.

#### 3. Validity

VALID G-GHHMM/M/G-GHHMMZ

reported in day and UTC time.

This group shall always be included in any report. Starting time validity shall be understood as "time of observation", while the validity period shall be referred to the forecasts of "movement" and "intensity" (see section 9 and 10).

No more than one report for each station (Rome Fiumicino and Milan Linate) shall be present at any given time.

#### 4. Echo intensity

This group shall always be included in any report. Any echo shall be classified as:

- |                   |         |
|-------------------|---------|
| a. feeble         | FBL     |
| b. moderate       | MOD     |
| c. moderate/heavy | MOD/HVY |
| d. heavy          | HVY     |



*ANY QUESTION?*

*THANKS FOR YOUR ATTENTION*



*Marta Luchini*