

Weather Radar Network Project of Iran

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Abstract

Islamic Republic of Iran Meteorological Organization (IRIMO) has been involved for establishment of weather radar network from 1997. The works were dependent on IRIMO's own personal and technical advises have been taken from WMO's experts and also experts of private sector in Iran. Here report of activities presented in this regard.

Introduction

Studying on a national weather radar network for Iran has been started at 1997. Need to a country wide radar network firstly motivated for flash flood forecasting and then other benefits of a radar network were considered.

To have technical cooperation of WMO, selection, evaluation and consultancy of this project was admitted to WMO through a trust fund agreement.

Finding the areas with the highest priority for receiving the radar, and also general technical specification of the radars to be installed was the first step, and this has been started by help of WMO advisor.

Studies on priorities

According to the statistic of rainfall, disaster of flood and sever weather condition in different zones of Iran and also and enroute of the effective fronts, the highest priority of radar installation were placed on Tehran , Tabriz(in E-Azarbayjan province) and Ahwaz (in Khuzestan province).[1]

Later further efforts were made for selection of final point for radar sites in a.m. provinces.

Site selection

Although due to wide and flat area in south west of Iran, site selection in Ahwaz area was not sophisticated, in north west of Iran, in Tabriz area -where two high chain of Alborz and Zagros mountains, meet each other- IRIMO encounters to a difficult job for site selection. More than 20 points were examined in that area and as at that time there was not compact software available for horizon and coverage calculation, it took long time to find the optimum point, by manual calculation. By choosing high elevation points cost of getting access to the point were increased dramatically and even be loosed sometimes due to cold climate of the area and by choosing low elevation points horizon will be closed hardly. One point close to TV station in good elevation and available access road was examined, but due to interference consideration were rejected.

In Tehran area the situation of the trains were better than Tabriz, but owning the land was not so easy close to capital city.

All of these three points were selected in range about 20 km far from the cities to minimize the clutter of the building and also to achieve better data on the city.

After a.m. studies, complimentary studies were done on 1998 and confirmed the previous results and in addition detailed specification of three radar were provided.[2][3].

Technical specification

Contract with Gemataronik company were signed for one S- Band and two C-Band Doppler weather radars. This supplier was selected through an international tender by IRIMO with consultancy of WMO.

One of the C-Band weather radars was requested to be dual polarized and the rest to be prepared to accept this feature later.

C- band radars have 250 KW peak power , while the S- band has 750KW.All the radars are Doppler and have klystron transmitter and digital receiver.

After the site location were finalized and the land were owned by IRIMO, design of infrastructure were started by Iranian consultant company, and access roads, buildings, tower, power and lightening protection system were designed professionally.[4]

In 2004 and 2005 two radars were installed in Ahwaz and TABriz on steel tower produced and erected by Iranian company.

Phase II and III

At the same time that the civil works was in the progress, IRIMO started to do site selection for next sites, and based on the previous experience, preferred to admit this job to Iranian consultant, which uses professional software for site surveying, but before that IRIMO prioritized next 3 and then next 6 area to receive radar. For that purpose a table of several items were created and filled according to data of different provinces as follow:

Item	Transportation by car	International flights	Domestic flights	Agricultural area	Flood disaster	Population
% of weight	20	10	10	15	25	20

According to the results these areas granted higher priority.

Shiraz, Kermanhsah, eastern Caspian(Mazandaran or Golestan) and then Mashhad, Isfahan, Bousher, Bandar-Abbas, Hamedan(or Zanzan), western Caspian(Gilan).

Although consultancy for these sites went through two different contracts , but same procedure were used for both .

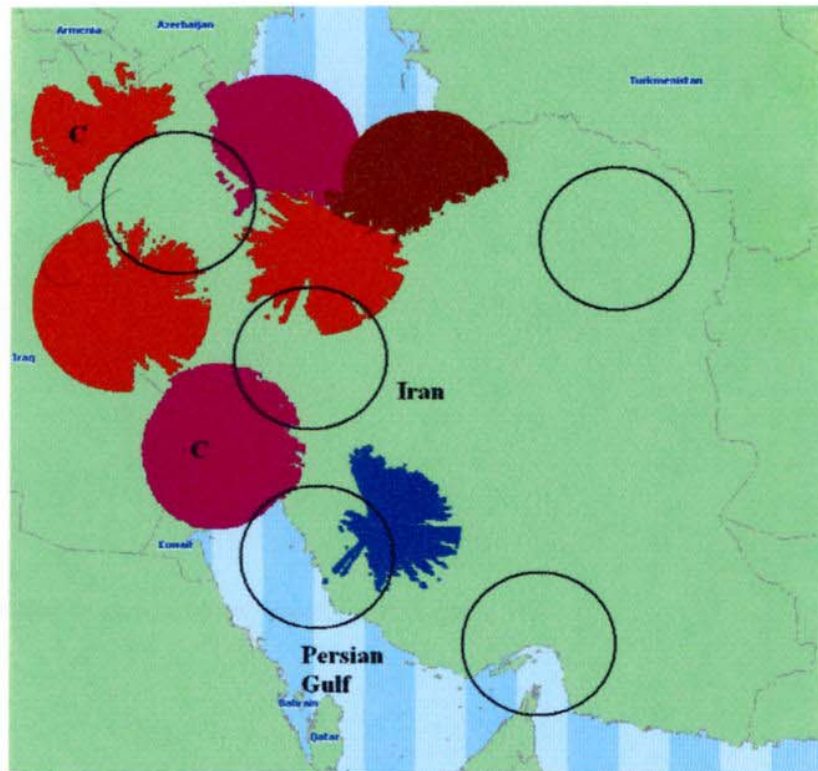
In each region 16 to 20 points were selected according to map survey and coverage at different levels from ground surface and sea level were provided.[5]

Site survey of the pre selected points, results 4 to 6 tentative sites and by applying local horizon data to the horizon and coverage diagram of each point and also considering the local facilities like access road, power line, communication link and other factors, final site and optimum height of the tower were determined.

Radiation safety for the people was one of the parameters has been considered for selection the final site and height of the tower as well.

There were 12 sites in IRIMO first plan and until now, we have 2 sites installed completely, in 5 sites contractors are doing infra structure and rest is site selection phase.

After completion of the weather radar network it is expected to have coverage like picture 1.

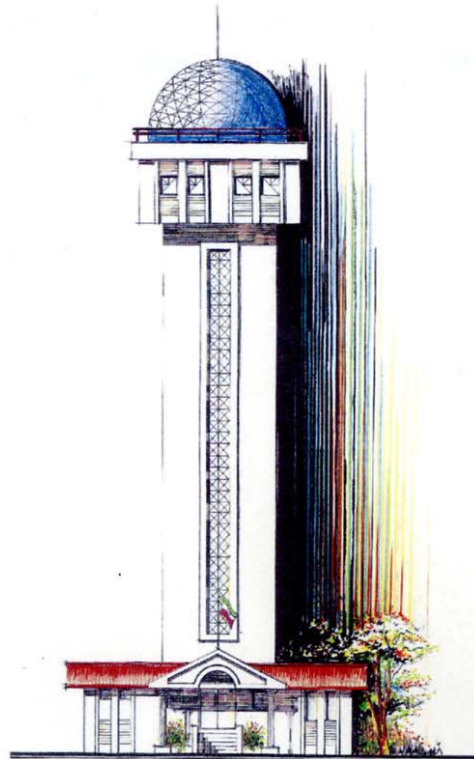


Picture 1 Coverage of radar sites, 1500 m above ground level. Completed sites were marked by C.

Until now all of the towers are steel tower except two towers in Caspian sea side which have been designed as concrete tower for more resistance in humid climate of the area

References

- 1 David R. Hudak. Doppler Radar Considerations for Islamic Republic of Iran Meteorological Organization. June 10.1998
- 2 Yahya Golestani. Site selection for the two C- and one S- band Doppler weather radar for Islamic Republic of Iran Meteorological Organization. August 21. 2000
- 3 Yahya Golestani. Advanced Weather Radar Considerations for Islamic Republic of Iran Meteorological Organization IRIMO. June 19. 1999
- 4 Tarh e Ertebatat Consultant. Detail design study of radar sites phase I. January 2002
- 5 Tarh e Ertebatat Consultant. Site selection report of radar project phase II. November 2003.



Picture 2 *Concrete tower of Mazandaran weather radar*