Draft Scenario for MPAR

Newark International Airport (EWR)

26-27 January, 2010

Present locations of terminal surveillance and weather radar for EWR are shown in Figure1. EWR TDWR is located 12.8 km south southwest of EWR airport.

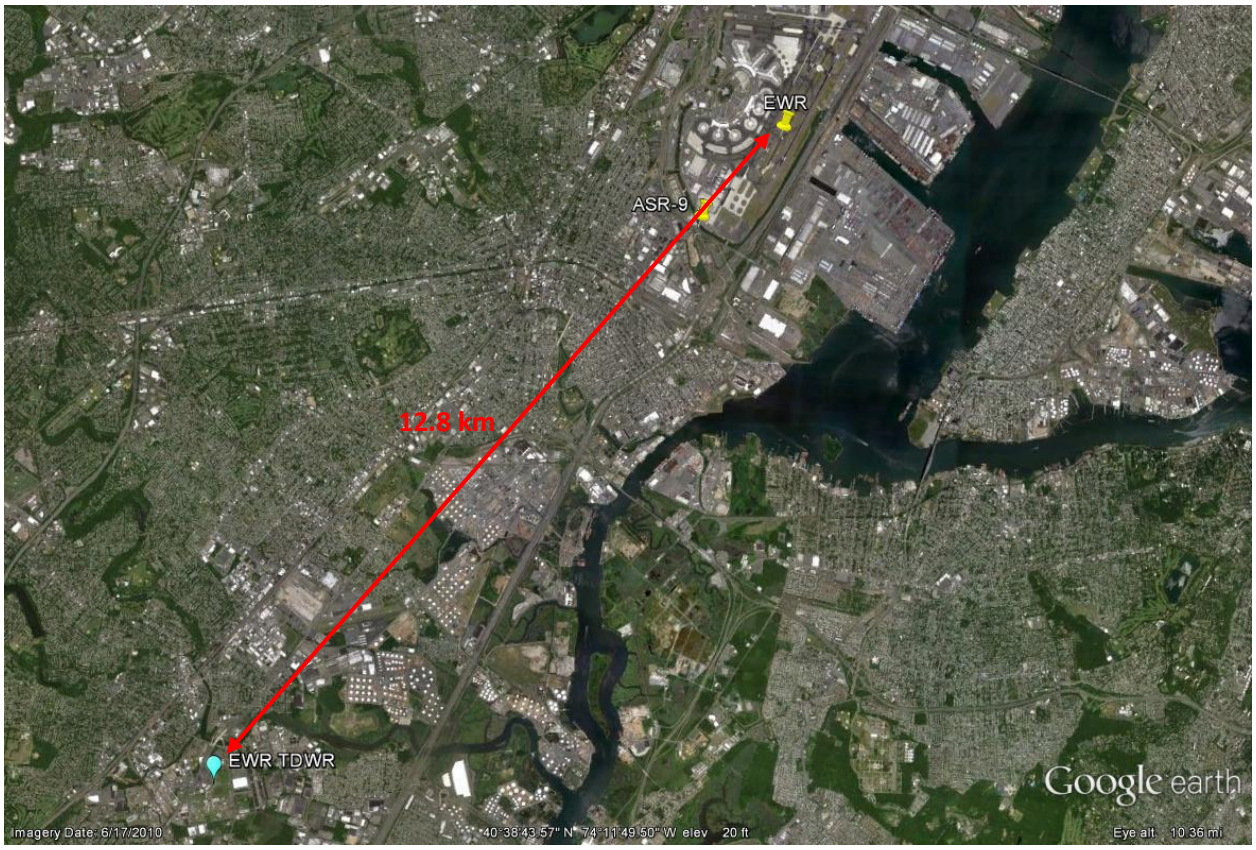

Figure 1. Location of EWR legacy radars

According to the MIT Initial Siting Study, an MPAR will be sited at the location of present ASR-9 terminal surveillance radar, just to the southwest of EWR ARP, on airport grounds (Figure 2).

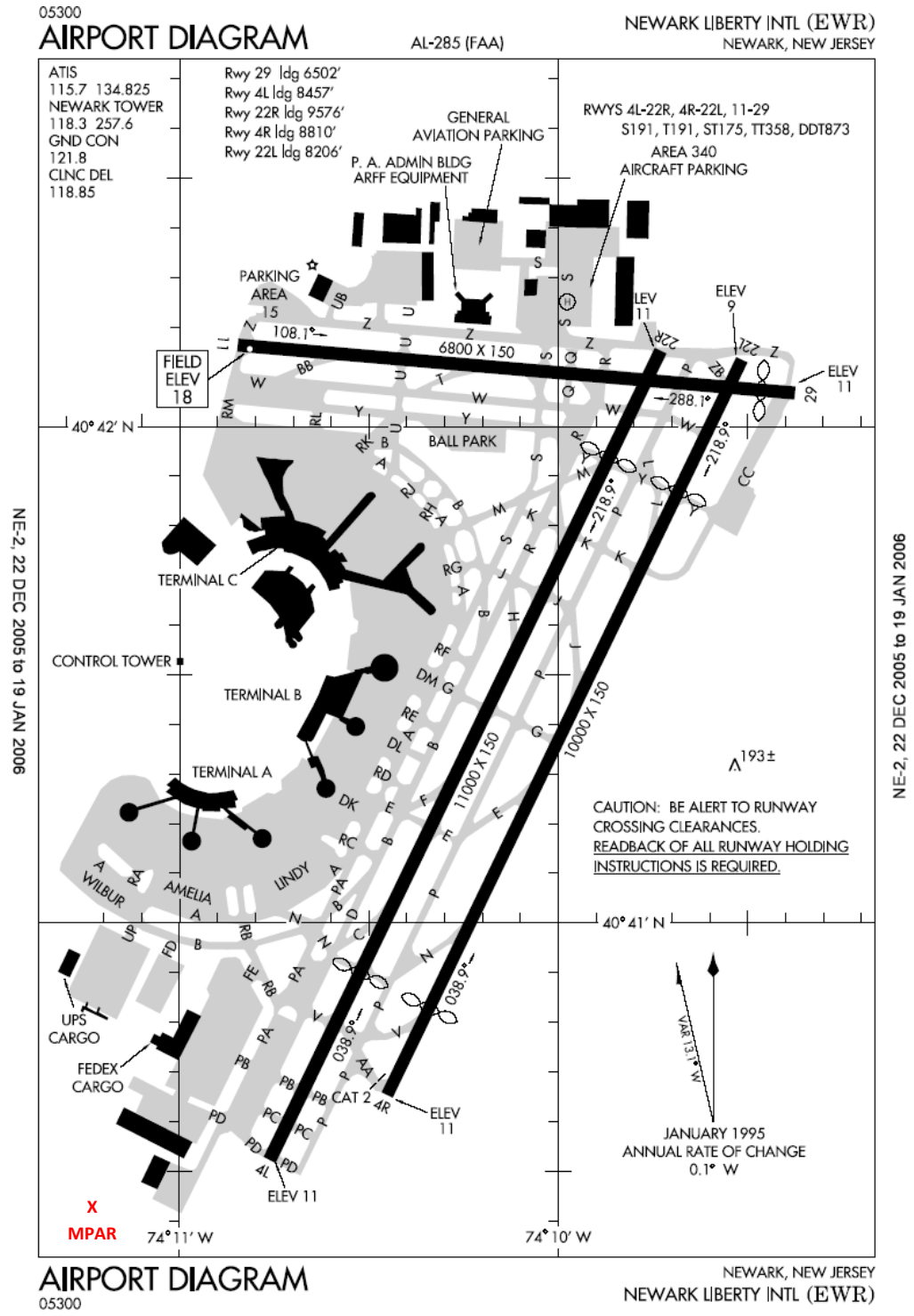

Figure 2: Location of EWR MPAR

This location will give MPAR good “down-runway” look angles for main 22L and 22R runways. A down-runway look angle is optimum for radar detection of windshear outflows from microburst posing hazard to aviation on takeoff/landing.

The purpose of this operational scenario is to describe, in sufficient detail to guide engineering designs, a winter storm at Newark International Airport. This scenario involves stressful, yet realistic levels of surveillance loading coupled with complex mixed phased weather. Data in the scenario below is based on actual data drawn from ETMS and NCWD databases, using AvMet's Weather Analysis Visualization Environment (WAVE) tool.

Winter weather, with returns showing mixed precipitation begins to encroach into the southeastern portions of the Newark terminal area on Wednesday, 26 January 2011. Figure 4 shows radar returns coupled with actual traffic at 1240Z (0740EST).

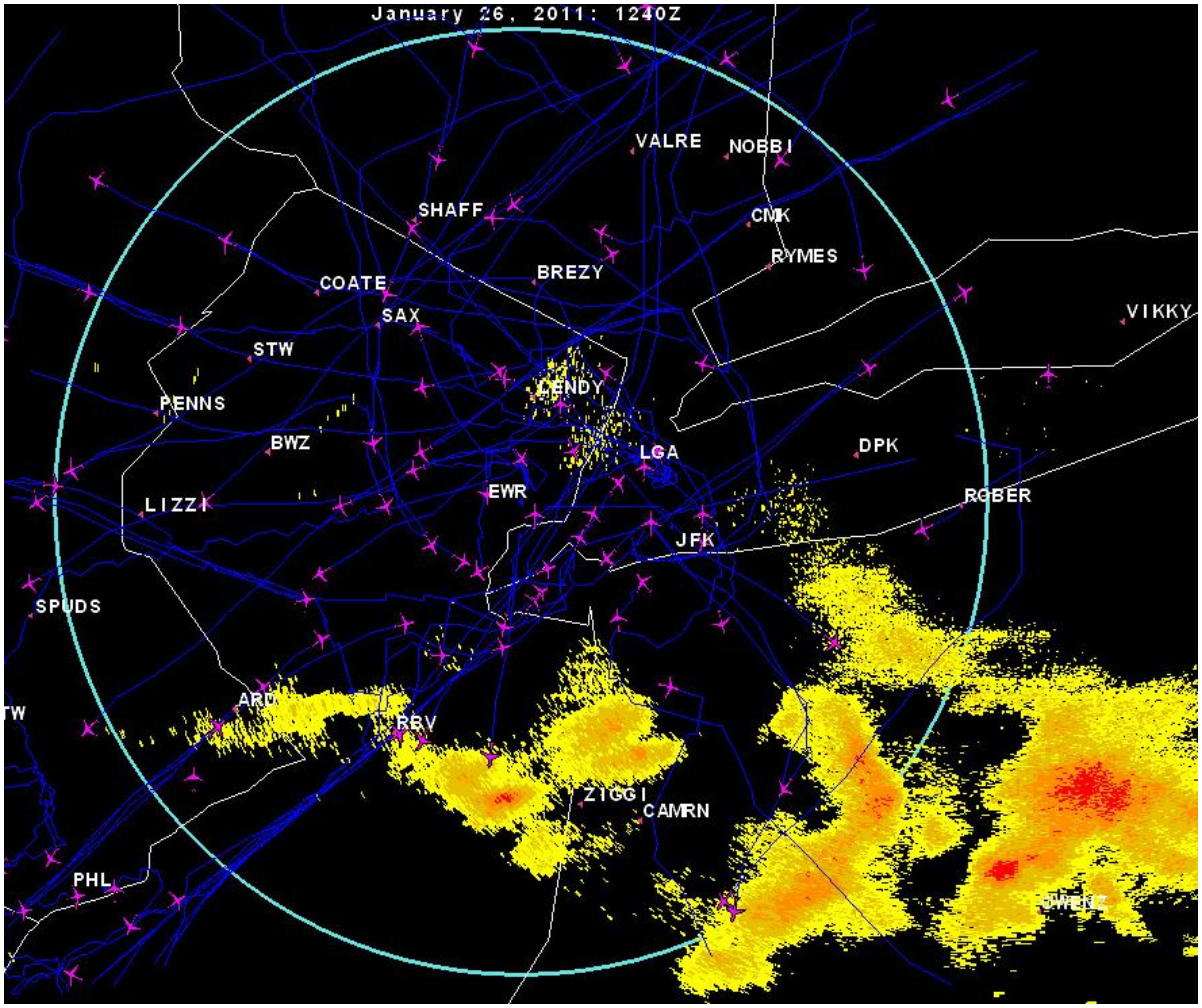

Figure 4. 26 January 2011, 1240Z

By 1520Z (1220EST) there is further movement of heavier winter weather into the Newark terminal area from the south (Figure 5). Notice the circular holding patterns to west and north of EWR as aircraft await weather to clear.

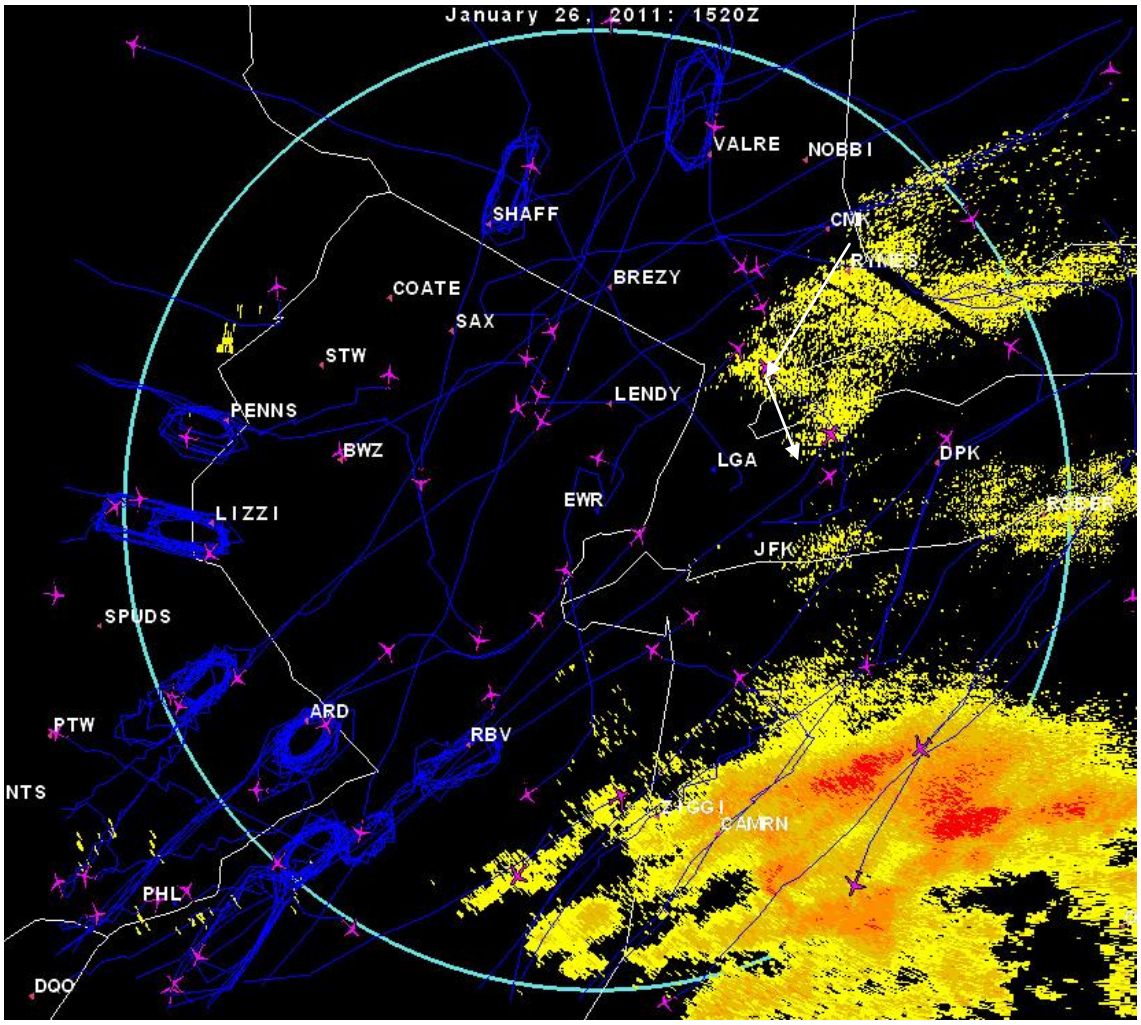

Figure 5. 26 January 2011, 1520Z

By 1900Z (1400 EST) the weather has mostly cleared, though there still a few pockets of locally heavier snow, one directly over the airfield, and one to the southeast (Figure 6).

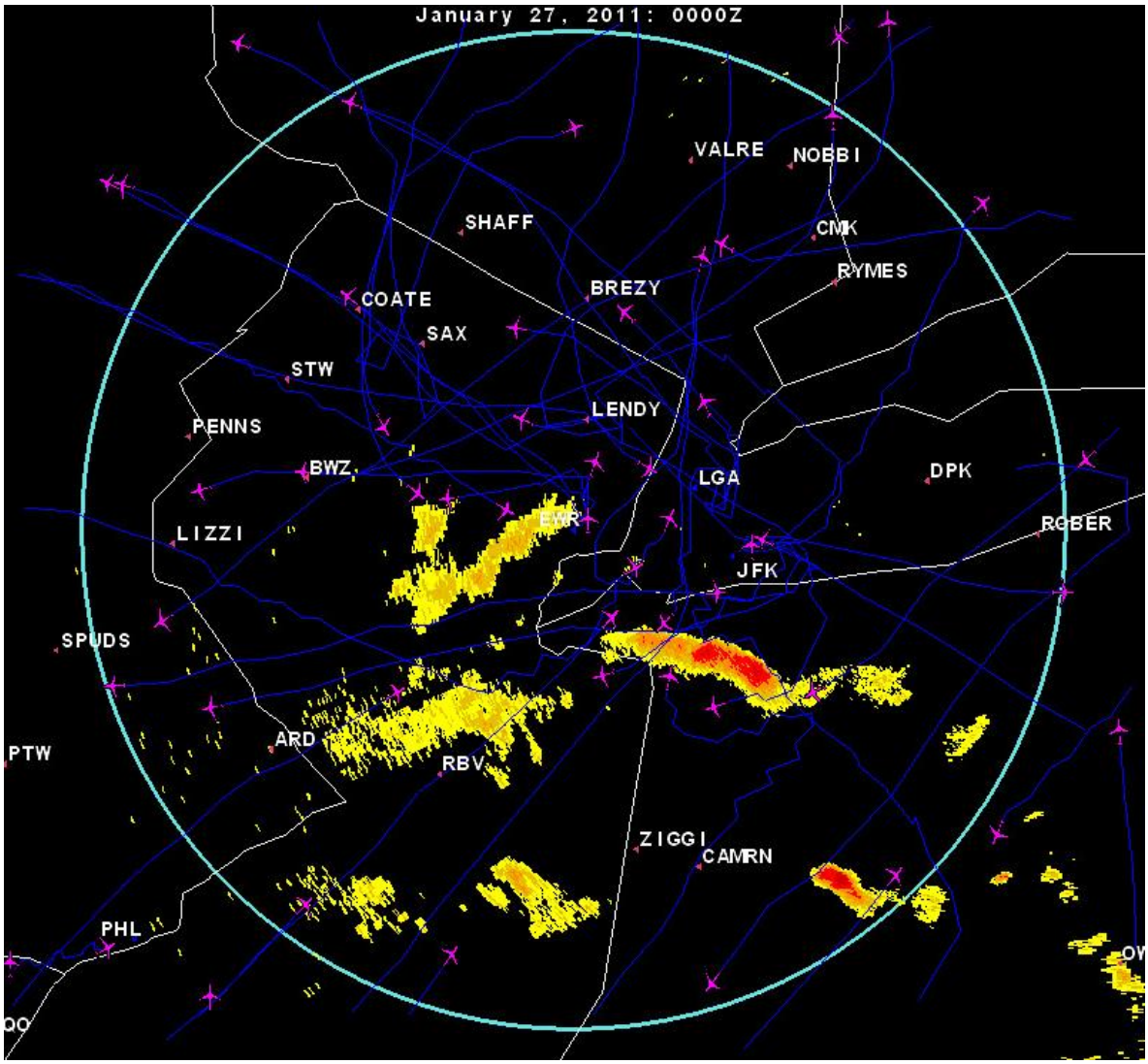

Figure 6. 27 January 2011, 0000Z

Widespread snow showers flare up again later in the evening at around 2000 EST. Figure 7 shows a considerable area of the EWR terminal area under snow showers, though by this time the level of air traffic has tapered off.

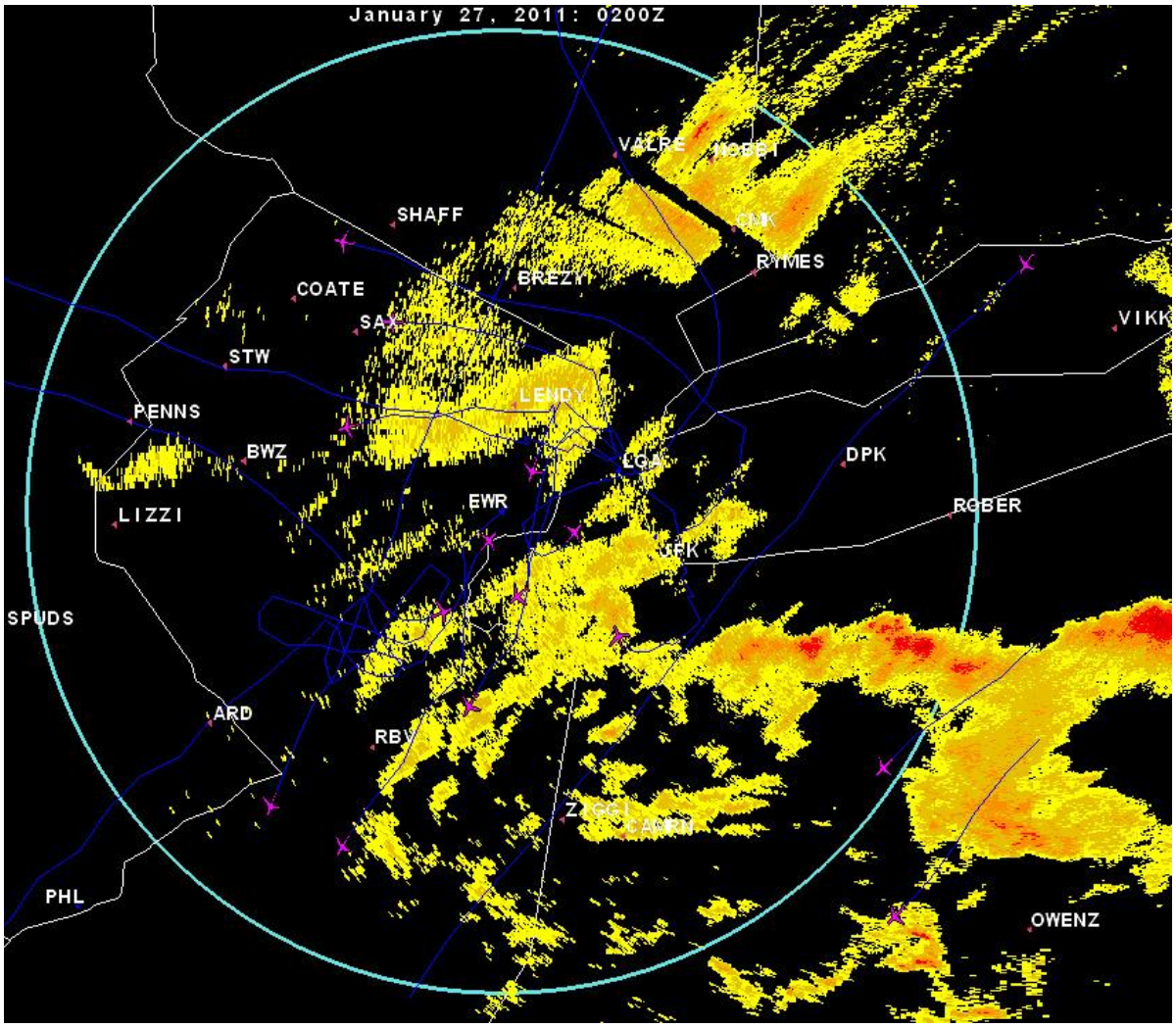

Figure 7. 27 January 2011 0200Z

WAVE analysis of the Newark case (Figure 8), shows two distinct peaks of weather activity: one between 1500 and 1600Z on 26 Jan, and another maximum between 0200Z to 0600Z on 27 Jan. Since this secondary weather peak aligns with quiet hours at Newark airport, we will focus on the earlier peak, which coincided with the busiest early afternoon traffic loads. Notice the dip in air traffic around 1520Z corresponding to a peak of weather activity.

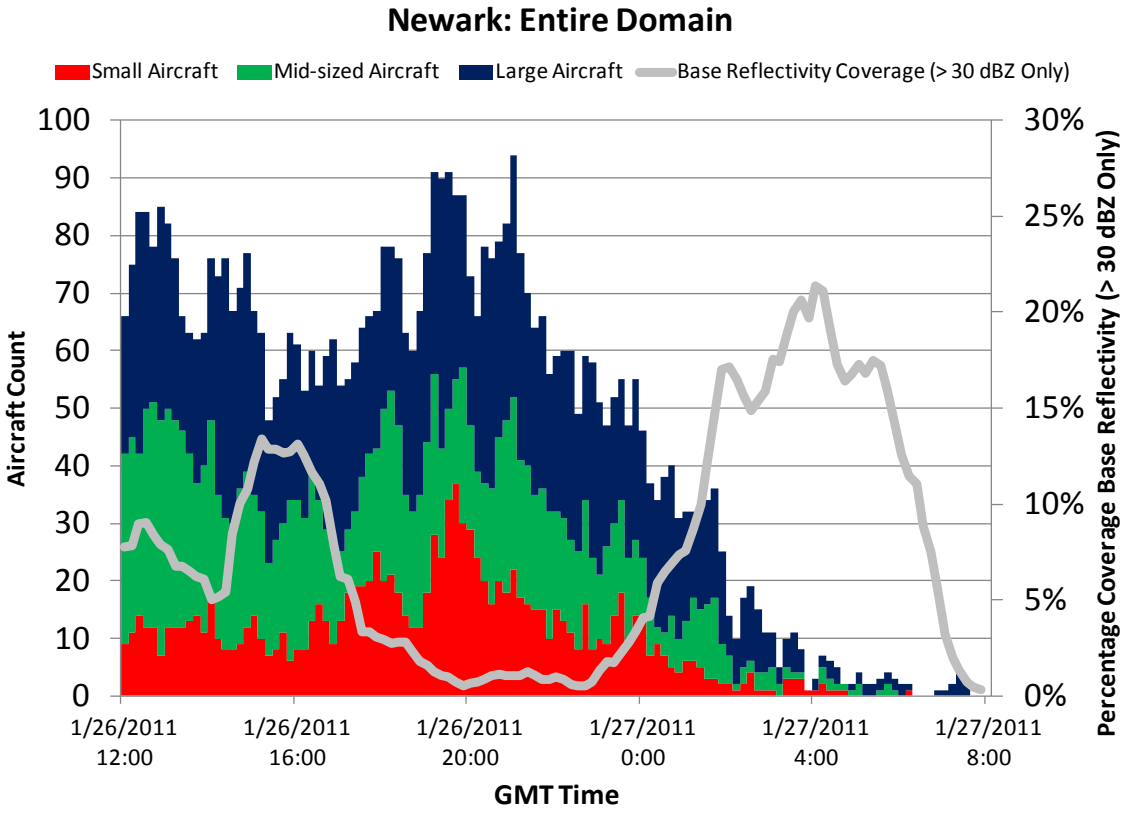

Figure 8. Traffic Counts and Convective Coverage within 60nm of EWR

Figures 9-12 show aircraft counts and convective coverage by quadrant (90° sector). The northeast quadrant (Figure 9) has relatively heavy traffic loading throughout, though little in the way of weather targets prior to 27 Jan, 00Z.

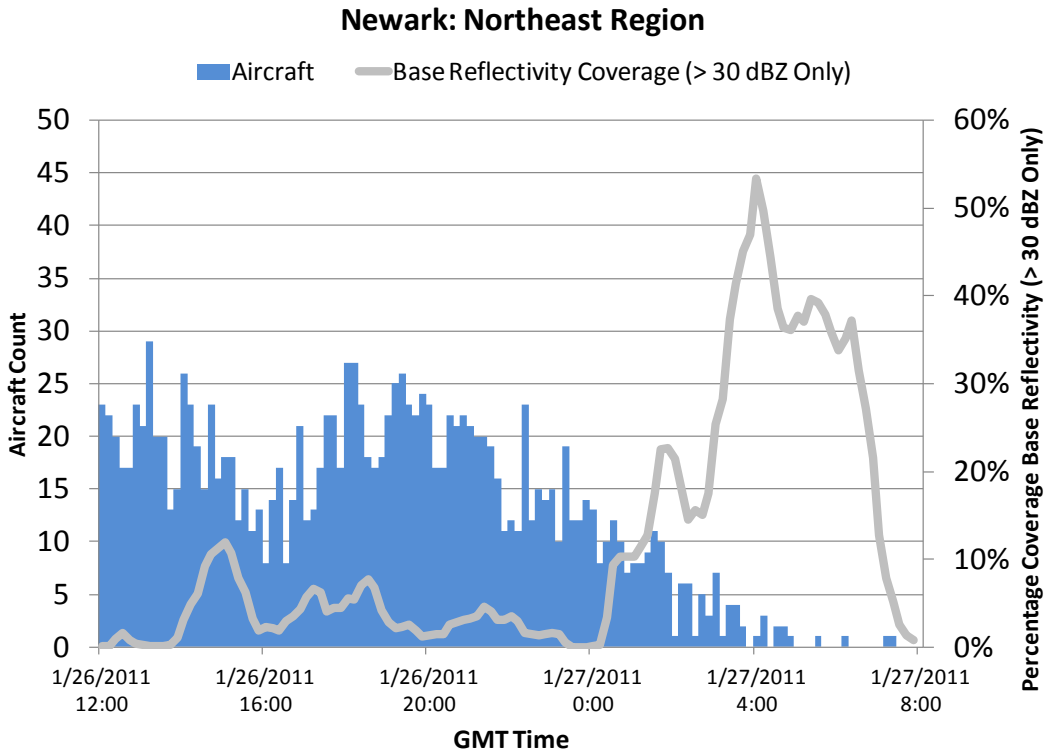

Figure 9. Northeast sector (0° to 90°)

From the southeast quadrant we see a much larger weather peak around 1600Z (Figure 10). While traffic in general tends to be lighter in this sector than to the northeast there is a noticeable dip in traffic corresponding to the spike in weather activity between 1400Z and 1700Z.

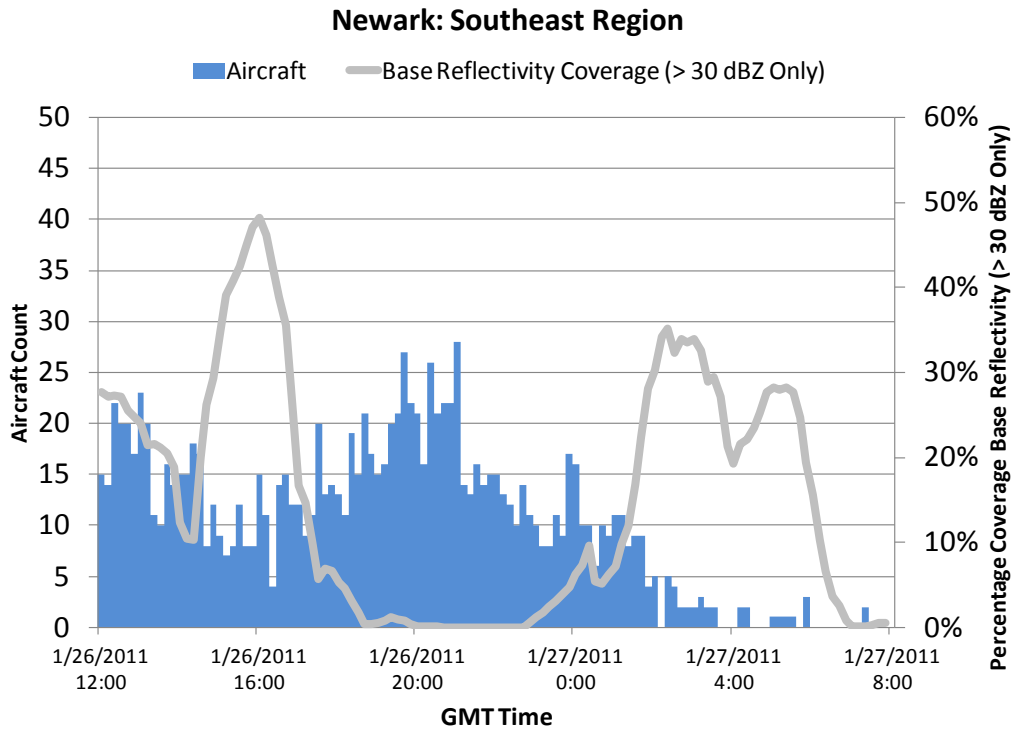

Figure 10. Southeast sector (90° to 180°)

To the southwest (Figure 11) and northwest (Figure 12) virtually no weather appears before 00Z though traffic appears steady and fairly heavy in both quadrants.

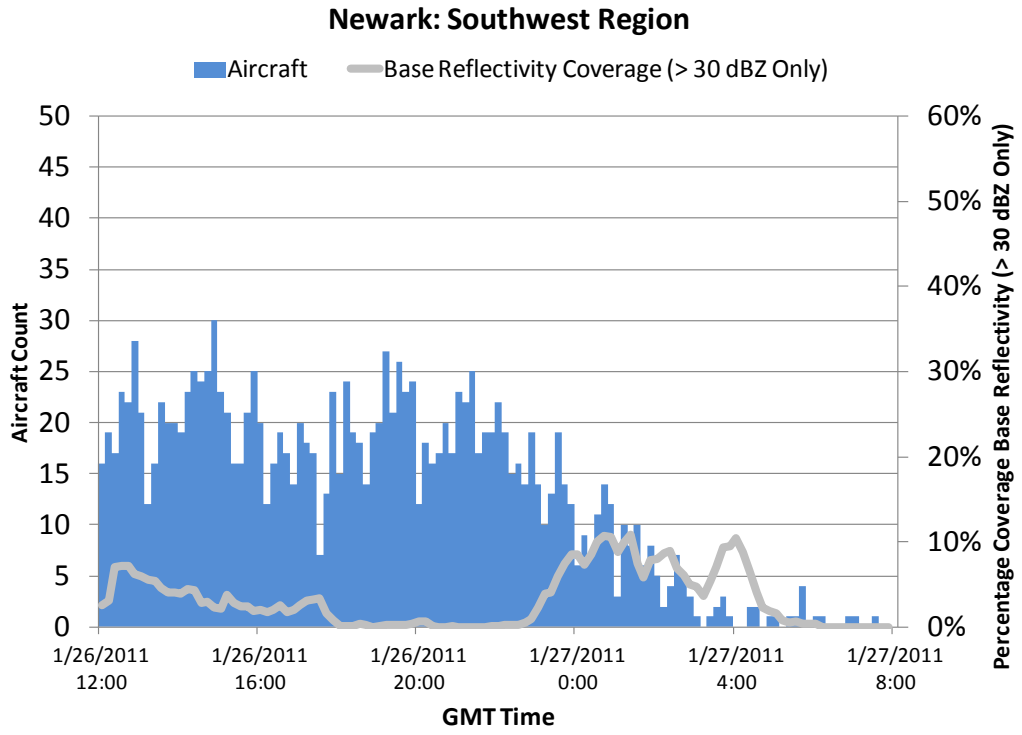

Figure 11. Southwest sector (180° to 270°)

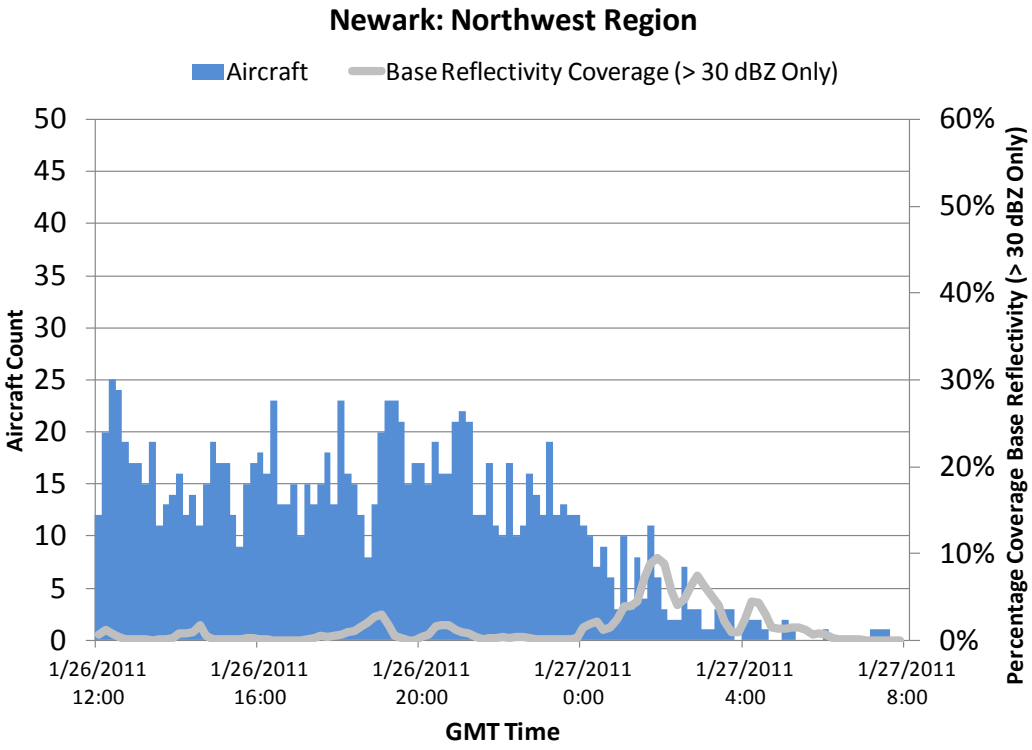

Figure 12. Northwest sector (270° to 360°)