

NYC97MA005

**METEOROLOGICAL
ATTACHMENT~~2~~
(48 Pages)**

191747

FINAL WEATHER BRIEFING

DL554/19/RLS 1
DISP 64 FL 370 ETE 0136
ATL 1830Z 1430L-LGA 2035Z 1635L ALTN IAD
ATL..EAONE..SPA.J14.CREWE.J51.FAK.MINKS1.LGA

19OCT1747

DESTINATION WEATHER

LGA 191500 METAR 191451Z 09024G31KT 2 1/2SM RA BR BKN009 OVC013
14/14 A2960 RMK AO2 PK WND 09031/1450 SLP023 6////
T01440139 58017 PNO
LGA 191602 METAR 191551Z 08025G30KT 2SM RA BR OVC012 15/14
A2959 RMK AO2 PK WND 08036/1508 TWR VIS 2 1/2 PRESFR
SLP018 R04/5500VP6000FT T01500144 PNO
LGA 191700 METAR 191651Z 08023G38KT 2SM RA BR BKN012 BKN018
OVC022 16/14 A2954 RMK AO2 PK WND 07038/1647 TWR VIS
2 1/2 PRESFR SLP003 T01560144 PNO

DESTINATION FORECAST

TERMINAL FORECAST

LGA DL 191720 AMD 01 VALID 191720-200600 UTC
6 BKN 12 OVC 2R-F 0924G42 OCNL 4 OVC 1RF ISOLD T
22Z 6 OVC 3R-F 1318G34 OCNL 11/2RF ISOLD T
23Z 6 OVC 3R-F 1716G28 ISOLD T
00Z 6 BKN 12 OVC 4F 1808 OCNL 2R-F

WEATHER AROUND DESTINATION

JFK 191700 METAR 191651Z 08031G41KT 2 1/2SM PRA BR BKN009
OVC021 14/14 A2953 RMK AO2 PK WND 08043/1628 PRESFR
SLP999 VIS 2V3 CTC 007V011 R04R/3500V4000FT P0017

①

19170139
JFK 191715 SPECI 191706Z 08027G42KT 5SM -RA BR BKN009 OVC020
14/14 A2953 RMK AO2 PK WND 08042/1700 P0001
EWR 191700 METAR 191651Z 09023G32KT 4SM RA BR BKN009 BKN014
OVC020 15/15 A2950 RMK AO2 PK WND 09039/1626 PRESFR
SLP989 P0027 T01500150
PHL 191700 METAR 191651Z 25008KT 10SM OVC009 10/08 A2949 RMK
AO2 SLP986 T01000083
PHL 191713 SPECI 191703Z 24007KT 10SM OVC011 10/08 A2949 RMK
AO2
BDL 191700 METAR 191651Z 06016G21KT 10SM OVC020 12/09 A2982 RMK
AO2 RAE1552 SLP098 T01220089
ALB 191706 METAR 191656Z 08012G18KT 10SM -RA OVC075 12/06 A2985
RMK AO2 RAB54 SLP111 P0000 T01170061

ALTERNATE AIRPORT WEATHER

IAD 191500 METAR 191451Z 31013G18KT 10SM BKN029 BKN034 OVC095
10/04 A2963 RMK AO2 SLP032 60000 T01000044 56008
IAD 191602 SPECI 191544Z 31014G24KT 10SM BKN034 OVC042 10/04
A2962 RMK AO2
IAD 191701 METAR 191651Z 31014G27KT 10SM OVC039 11/03 A2960 RMK
AO2 PK WND 29027/1624 SLP023 T01060033

ALTERNATE FORECAST

TERMINAL FORECAST

IAD DL 191600 VALID 191600-200600 UTC
30 BKN 70 OVC 10 3116G28 BR 7RW-
20Z 15 SCT 30 BKN 70 OVC 10 3116G28 OCNL 15 BKN 30 OVC 4RW-

ORIGIN WEATHER

ATL 191602 METAR 191556Z 33016G23KT 10SM CLR 14/M01 A3000 RMK
AO2 PK WND 32028/1542 SLP159 T01391006
ATL 191707 METAR 191656Z 32017G22KT 10SM CLR 15/M01 A2999 RMK
AO2 SLP155 T01501006

ORIGIN FORECAST

TERMINAL FORECAST

ATL DL 191600 VALID 191600-200600 UTC
CLR 10 3212
00Z CLR 10 3008

TAKEOFF ALTERNATE WEATHER

NO REPORT

ENROUTE SURFACE WEATHER

GSP 191701 METAR 191655Z VRB05KT 10SM CLR 14/M03 A2989 RMK AO2
SLP118 T01441033
GSO 191701 METAR 191654Z 29016G22KT 10SM FEW065 13/M01 A2981
RMK AO2 SLP093 T01331011
RIC 191701 METAR 191654Z 29019G22KT 10SM OVC055 14/02 A2966 RMK
AO2 SLP047 T01390022
ILG 191700 METAR 191651Z AUTO 28011KT 10SM 09/07 A2951 RMK AO2
SLP991 T00940067 TSNO
ILG 191725 SPECI 191716Z AUTO 23010KT 10SM OVC015 10/07 A2952
RMK AO2 TSNO
EWR 191700 METAR 191651Z 09023G32KT 4SM RA BR BKN009 BKN014
OVC020 15/15 A2950 RMK AO2 PK WND 09039/1626 PRESFR
SLP989 P0027 T01500150

METRO ALERTS

SE1 191526-200600

***** SOUTHEAST REGION *****

FROM PSK-RDU-DIW-BACUS
BAND MDT TURBC 120NM WIDE FL120-240..FRNT..LGT-MDT
370-410/TROP

2

NE1 191345-200600

***** NORTHEAST REGION *****

FROM ROD-50SW HNN-PSK-RDU
BAND MDT TURBC 120NM WIDE FL120-240..FRNT..LGT-MDT
370-410/TROP
MOVG ESE 10KT..TURBC DCRSG FROM NW OH/WV AFTER 00Z

FROM YXU-CXR-AIR-CSN-50S SWL-CROAK
BAND MDT TURBC 80NM WIDE FL150-310..TROF
MOVG SLOWLY E 5KT

FROM LINND-JFK-BUF-VKG-YSB
BAND MDT TURBC 120NM WIDE FL180-290..FRNT..WITH MDT TURBC
BLO FL100 AND LGT-MDT TROP TURBC 370-410
MOVG E SLOWLY..APPROX 5KT

OVER OFFSHORE WATERS BTWN 65W-72W AND 37N-41N
AREA WDLY SCTD TRW TOPS 420
AREA MOVG E 10KT/CELL MVMT NNE 25KT

GOVERNMENT WEATHER ALERTS

U95 191645-192045 SIGMET UNIFORM 2 VALID UNTIL 192045 MA RI CT
NY NJ PA WV MD DC DE VA AND CSTL WTRS FROM ALB TO ACK TO
SBY TO BKW TO SLT TO ALB MOD OCNL SEV TURB BLW 160 IN AREA
STG WNDS AND GEN RUFF TRRN. CONDS CONTG BYD 2045Z.

DELTA PIREPS

POS DAL0344 19 RDU OVR 1552 ALT 330 FOB 0217 SAT 43
WND 289087 MCH 076 TRB SMOOTH SKY CLEAR
POS DAL0512 19 CREWE OVR 1542 ALT 370 FOB 0216 SAT 45
WND 288070 MCH 081 TRB SMOOTH SKY CLEAR
POS DAL1514 19 RIC OVR 1546 ALT 290 FOB 0187 SAT 32
WND 248030 MCH 760 TRB LIGHT SKY BROKEN
POS DAL0654 19 OTT OVR 1453 ALT 330 FOB 0195 SAT 40
WND 174038 MCH 790 TRB LIGHT SKY CLEAR
POS CSN OVR 1711 NXT ETA ENS
ALT 390 FOB 0390 SAT 46 WND 228020 MCH 80 TRB

SUBSEQUENT STATIONS

NONE

AIRPORT ALERTS

ATL NO REPORT
LGA 191711-200000 MDT TO STRONG TURBC CLB/DSCNT BLO FLO70 WITH
LLWS LIKELY DUE EASTERLY SFC WNDS G 35KT BCMG WESTERLY SFC
WNDS ACCOMPANING 20Z-22Z SFC FRONTAL PASSAGE
IAD 191716-200000 MDT TURBC CLB/DSCNT BLO FL100 WITH LLWS PSBL
DUE SFC FRONTAL PASSAGE...SFC WNDS WNW BCMG ESE ABV FLO40

FIELD CONDITIONS

ATL NO REPORT
LGA NO REPORT
IAD 190021-200000 IAD F/C REPORT ALL AREAS ARE EXTREMELY WET
HIGH WIND*S GUSTING TO 35 KNOT AT 2330 Z USE EXTREME
CAUTION WHILE TAXING ON RAMP AREA ALL A/C CONTACT DL/OPS
131.85 -10 MINUTES OUT- IADOPS/SUP

FINAL BRIEFING DL554/19 RLS NBR 01 END

3

December 27, 1996

LGA Aircraft Incident - 10/19/96

The METAR/SPECI reports, 5-minute observations, 1-minute archive engineering data, and the system's maintenance log have been reviewed for this incident. Below is a moment-by-moment analysis of the events from 14:49 LST through 15:59 LST. This analysis presents our best interpretation of the events based on the data available. It is our understanding that the incident occurred at 1539 LST.

In the future, ASOS will have an EDIT LOG feature that will record the observer's and air traffic controller's interactions with the system. This will allow those providing data analysis greater insight to the activities occurring at the site during periods of interest. The EDIT LOG is scheduled to be included in software version 2.50 which should be implemented during mid 1997.

During the time period mentioned above, all of the sensors were operational and the following sensors were in automatic mode of operation: ambient/dew point temperature; precipitation identification; wind speed and direction; and precipitation accumulation gauge. Please note that heavy rain was reported during this time period and the precipitation gauge did not provide any accumulations. Therefore, ASOS placed a Maintenance Indicator sign (i.e., \$) and a PNO (precipitation amount not available) remark at the end of the reports and observations. There were edit actions taken by the observer during this period where the sky condition, visibility, and precipitation accumulations were backed-up for unrepresentativeness. The observer also provided augmentation for Runway Visual Range (RVR) information. In short, with the exception of the rain gauge, ASOS appears to be operating normally. See analysis beginning of page 2.

Analysis of Events

**** 14:49 LST: Observer EDIT Action to Enter RVR ****

10/19/96 14:52:33 METAR KLGA 191951Z 08014G22KT 1 1/4SM +RA BR
BKN013 OVC019 14/14 A2950 RMK AO2 PK WND 07034/1917 TWR VIS 2 1/2
PRESRR SLP990 R04/4000VP6000FT T01440144 PNO \$ (DQ)

**** Note:** After the hourly METAR is transmitted, all fields, except tower visibility and present weather, will be reset to automatic mode or cleared. Since present weather is in automatic mode, only the manually entered tower visibility will remain. Notice that the RVR entry has been cleared between 1951Z and 1955Z. ******

5-MIN KLGA 191955Z 09016G23KT 1 1/4SM +RA BR SCT009 OVC015 14/14
A2950 410 96 500 100/16G23 RMK AO2 TWR VIS 2 1/2 PNO \$

**** Between 14:55:23 and 14:55:59 LST: Observer EDIT action to change sky condition from "SCT009 OVC015" to "OVC013"?**

**** 14:58 LST: Observer EDIT action to change surface visibility from "1" to "1 1/4." Algorithm output would have been 1 mile. ****

5-MIN KLGA 192000Z 10016G23KT 1 1/4SM +RA BR OVC013 14/14 A2951 400
96 500 110/16G23 RMK AO2 TWR VIS 2 1/2 PNO \$

5-MIN KLGA 192005Z 10012G22KT 1 1/4SM +RA BR OVC013 15/14 A2952 400
96 500 110/12G22 RMK AO2 TWR VIS 2 1/2 PRESRR PNO \$

5-MIN KLGA 192010Z 09011G21KT 1 1/4SM +RA BR OVC013 15/14 A2951 410
96 500 100/11G21 RMK AO2 TWR VIS 2 1/2 PRESRR PNO \$

5-MIN KLGA 192015Z 07010KT 1 1/4SM +RA BR OVC013 14/14 A2951 410
100 500 080/10 RMK AO2 TWR VIS 2 1/2 PRESRR PNO \$

5-MIN KLGA 192020Z 08012KT 1 1/4SM +RA BR OVC013 14/14 A2949 420 96
500 090/12 RMK AO2 TWR VIS 2 1/2 PRESRR PNO \$

**** 15:24 LST: Observer Enters The EDIT Function ****

5-MIN KLGA 192025Z 08017KT 1 1/4SM +RA BR OVC013 14/14 A2950 420
100 500 100/17 RMK AO2 TWR VIS 2 1/2 PRESFR PNO \$

**** 15:26 LST: Observer exits the EDIT function. Based on 1-minute data, the surface visibility is RESET to automatic mode of operation, i.e., 3/4. The observer entered the RVR based on the new visibility. The observer RESET the sky condition to automatic mode of operation and a broken layer at 800 feet appears. ****

5

10/19/96 15:28:26 SPECI KLGA 192027Z 08014KT 3/4SM +RA BR BKN008
OVC013 14/14 A2949 RMK AO2 TWR VIS 2 1/2 PRESFR R04/4000V4500FT PNO
\$ (DQ)

5-MIN KLGA 192030Z 09014KT 3/4SM +RA BR BKN008 BKN013 OVC021 14/14
A2951 410 100 500 100/14 RMK AO2 TWR VIS 2 1/2 PRESFR
R04/4000V4500FT PNO \$

** 15:33 LST: Observer enters the EDIT function. Here the
sky condition is placed in manual mode by the observer
backing up the ceilometer. EDIT entry shows a layer of
SCT006 was changed to BKN008. **

10/19/96 15:35:27 SPECI KLGA 192034Z 09012KT 1/2SM +RA FG BKN008
BKN011 OVC019 14/14 A2950 RMK AO2 TWR VIS 2 1/2 PRESFR
R04/4000V4500FT PNO \$ (DQ)

5-MIN KLGA 192035Z 09011KT 1/2SM +RA FG BKN008 BKN011 OVC019 14/14
A2950 420 100 500 100/11 RMK AO2 TWR VIS 2 1/2 PRESFR
R04/4000V4500FT PNO \$

*** INCIDENT OCCURRED AT 2039Z / 1539 LST ***

5-MIN KLGA 192040Z 06016KT 1/2SM +RA FG BKN008 BKN011 OVC019 14/14
A2948 430 100 500 080/16 RMK AO2 TWR VIS 2 1/2 PRESFR
R04/4000V4500FT PNO \$

5-MIN KLGA 192045Z 06016KT 3/4SM +RA BR BKN008 BKN011 OVC019 14/14
A2949 430 100 500 080/16 RMK AO2 TWR VIS 2 1/2 PRESFR SLP985
R04/4000V4500FT 6//// T01440144 56005 PNO \$

5-MIN KLGA 192050Z 07014KT 1SM +RA BR BKN008 BKN011 OVC019 14/14
A2950 410 100 500 080/14 RMK AO2 TWR VIS 2 1/2 PRESFR SLP990
R04/4000V4500FT 6//// T01440144 56005 PNO \$

** 15:50 LST: Observer enters EDIT function after
15:50:23 LST based on change of wind data in the EDIT-
ENTRY and EDIT-EXIT printouts. The observer changed the
RVR entry in remarks, but he was in the EDIT process
when the METAR was transmitted. Therefore, his EDIT was
not encoded in the METAR. **

10/19/96 15:52:30 METAR KLGA 192051Z 07013KT 1SM +RA BR BKN008
BKN011 OVC019 14/14 A2950 RMK AO2 TWR VIS 2 1/2 PRESFR SLP990
R04/4000V4500FT 6//// T01440144 56005 PNO \$ (DQ)

** 15:51 LST: Observer exits the EDIT function after
15:51:23 LST, i.e., when the METAR is transmitted.

** 15:51 LST: Observer enters the EDIT function. It is
not clear if ASOS or the observer RESET the sky field
to the automatic mode of operation. EDIT exit is done
in the same minute. **

6

10/19/96 15:59:27 ~~METAR~~ KLGA 192051Z ~~COR~~ 07013KT 1SM +RA BR BKN008
BKN011 OVC019 14/14 A2950 RMK AO2 TWR VIS 2 1/2 PRESFR SLP990
R04/4000V5000FT 60137 T01440144 56005 PNO \$ (DQ)

** A Correction is issued to fix the RVR entry and to fix
the precipitation accumulation group (60137). **

7

ARCSMIN 3

PREPARE TO RECEIVE IN 10 SECONDS

LISTING SMIN ARCHIVE #3, 10/19/1996 14:55 LST

5-MIN KLGA 191955Z 09016G23KT 1 1/4SM +RA BR SCT009 OVC015 14/14 A2950 410
96 500 100/16G23 RMK AO2 TWR VIS 2 1/2 PNO \$
5-MIN KLGA 192000Z 10016G23KT 1 1/4SM +RA BR OVC013 14/14 A2951 400 96 500
110/16G23 RMK AO2 TWR VIS 2 1/2 PNO \$
5-MIN KLGA 192005Z 10012G22KT 1 1/4SM +RA BR OVC013 15/14 A2952 400 96 500
110/12G22 RMK AO2 TWR VIS 2 1/2 PRESRR PNO \$
5-MIN KLGA 192010Z 09011G21KT 1 1/4SM +RA BR OVC013 15/14 A2951 410 96 500
100/11G21 RMK AO2 TWR VIS 2 1/2 PRESRR PNO \$
5-MIN KLGA 192015Z 07010KT 1 1/4SM +RA BR OVC013 14/14 A2951 410 100 500
080/10 RMK AO2 TWR VIS 2 1/2 PRESRR PNO \$
5-MIN KLGA 192020Z 08012KT 1 1/4SM +RA BR OVC013 14/14 A2949 420 96 500
090/12 RMK AO2 TWR VIS 2 1/2 PRESRR PNO \$
5-MIN KLGA 192025Z 08017KT 1 1/4SM +RA BR OVC013 14/14 A2950 420 100 500
100/17 RMK AO2 TWR VIS 2 1/2 PRESRR PNO \$
5-MIN KLGA 192030Z 09014KT 3/4SM +RA BR BKN008 BKN013 OVC021 14/14 A2951
410 100 500 100/14 RMK AO2 TWR VIS 2 1/2 PRESRR R04/4000V4500FT PNO \$
5-MIN KLGA 192035Z 09011KT 1/2SM +RA FG BKN008 BKN011 OVC019 14/14 A2950
420 100 500 100/11 RMK AO2 TWR VIS 2 1/2 PRESRR R04/4000V4500FT PNO \$
5-MIN KLGA 192040Z 06016KT 1/2SM +RA FG BKN008 BKN011 OVC019 14/14 A2948
430 100 500 080/16 RMK AO2 TWR VIS 2 1/2 PRESRR R04/4000V4500FT PNO \$
5-MIN KLGA 192045Z 06016KT 3/4SM +RA BR BKN008 BKN011 OVC019 14/14 A2949
430 100 500 080/16 RMK AO2 TWR VIS 2 1/2 PRESRR SLP985 R04/4000V4500FT
6//// TO1440144 56005 PNO \$
5-MIN KLGA 192050Z 07014KT 1SM +RA BR BKN008 BKN011 OVC019 14/14 A2950 410
100 500 080/14 RMK AO2 TWR VIS 2 1/2 PRESRR SLP990 R04/4000V4500FT 6////
TO1440144 56005 PNO \$
5-MIN KLGA 192055Z 07013KT 1SM +RA BR BKN008 BKN015 OVC021 14/14 A2950 410
100 500 080/13 RMK AO2 TWR VIS 2 1/2 PNO \$
5-MIN KLGA 192100Z 06014KT 1SM +RA BR BKN008 BKN015 OVC021 14/14 A2950 420
100 500 080/14 RMK AO2 TWR VIS 2 1/2 PNO \$
5-MIN KLGA 192105Z 06012KT 1 1/2SM +RA BR FEW005 BKN010 OVC015 14/14 A2950
420 100 500 070/12 RMK AO2 TWR VIS 2 1/2 PNO \$
5-MIN KLGA 192110Z 06012KT 1 1/4SM +RA BR FEW005 BKN012 OVC024 14/14 A2950
420 100 500 070/12 RMK AO2 TWR VIS 2 1/2 PNO \$
5-MIN KLGA 192115Z 06010KT 1 1/2SM +RA BR FEW007 BKN012 OVC024 14/14 A2949
420 100 500 080/10 RMK AO2 TWR VIS 2 1/2 PNO \$
SMIN ARCHIVE LISTING COMPLETE, 17 SMIN(S) LISTED.

CMD>OBS 1019 0000 1020 0000

PREPARE TO RECEIVE IN 10 SECONDS

LISTING OBS FROM: 10/19/1996 00:00 THRU 10/20/1996 00:00

10/19/96 00:52:25 METAR KLGA 190551Z 08017G21KT 10SM OVC017 13/11 A2977
RMK AO2 SLP081 TO1330111 10139 20128 56032 (TC)
10/19/96 01:52:45 METAR KLGA 190651Z 09021KT 10SM OVC015 13/11 A2974 RMK
AO2 SLP070 TO1330111 (TC)
10/19/96 02:52:30 METAR KLGA 190751Z 07019G29KT 10SM OVC017 13/11 A2970
RMK AO2 PK WND 08029/0749 PRESRR SLP056 TO1330111 (TC)
10/19/96 03:40:28 SPECI KLGA 190839Z 09018G23KT -RA 13/12 A2968 RMK AO2
RAB0756E08B29 P0000 \$ (TC)
10/19/96 03:52:45 METAR KLGA 190851Z 10024KT 7SM -RA 13/12 A2968 RMK AO2
RAB0756E08B29 SLP051 P0000 60000 TO1330117 56032 \$ (TC)
10/19/96 03:59:29 METAR KLGA 190851Z COR 10024KT 7SM -RA OVC015 13/12
A2968 RMK AO2 RAB0756E08B29 SLP051 P0000 60000 TO1330117 56032 \$ (TC)
10/19/96 04:52:31 METAR KLGA 190951Z 09020G28KT 9SM -RA OVC015 13/12 A2968
RMK AO2 PK WND 09028/0900 SLP050 P0000 TO1330122 \$ (TC)
10/19/96 05:00:34 SPECI KLGA 190959Z 09025G32KT 10SM -RA OVC013 13/12
A2968 RMK AO2 PK WND 09032/0954 P0000 \$ (TC)
10/19/96 05:52:50 METAR KLGA 191051Z 09020G29KT 10SM OVC011 13/13 A2966
RMK AO2 PK WND 09032/0954 RAE01B29E47 CIG 009V013 SLP043 P0000 TO1330128 \$

8

(TC)
 10/19/96 06:35:47 SPECI KLGA 191134Z 09024G31KT 9SM OVC008 14/13 A2965 RMK
 AO2 PK WND 08031/1133 \$ (TC)
 10/19/96 06:52:26 METAR KLGA 191151Z 08020G29KT 9SM OVC008 14/13 A2964 RMK
 AO2 PK WND 08031/1133 SLP036 60000 T01390133 10144 20128 58013 \$ (TC)
 10/19/96 07:30:26 SPECI KLGA 191229Z 07022G27KT 10SM OVC010 14/13 A2964
 RMK AO2 PK WND 09031/1200 CIG 008V013 \$ (TC)
 10/19/96 07:43:00 TC LOGGED OFF AS OBSERVER FROM OID#1
 10/19/96 07:43:13 TC LOGGED ON AS OBSERVER FROM OID#1
 10/19/96 07:52:37 METAR KLGA 191251Z 08023G28KT 10SM OVC012 14/13 A2965
 RMK AO2 PK WND 09031/1200 SLP039 T01440128 \$ (TC)
 10/19/96 08:33:39 SPECI KLGA 191332Z 08019KT 2 1/2SM -RA BR OVC012 14/13
 A2963 RMK AO2 PK WND 07031/1256 SFC VIS 3 RAB02 P0000 \$ (TC)
 10/19/96 08:52:30 METAR KLGA 191351Z 07024G30KT 2 1/2SM RA BR OVC012 14/13
 A2962 RMK AO2 PK WND 07031/1256 SFC VIS 3 SLP029 P0006 T01390133 PNO \$
 (TC)
 10/19/96 08:56:30 METAR KLGA 191351Z COR 07024G30KT 2 1/2SM RA BR OVC012
 14/13 A2962 RMK AO2 PK WND 07031/1256 SFC VIS 3 SLP029 P0002 T01390133 PNO
 \$ (TC)
 10/19/96 08:56:30 TC LOGGED OFF AS OBSERVER FROM OID#1
 10/19/96 08:56:30 DQ LOGGED ON AS OBSERVER FROM OID#1
 10/19/96 09:52:43 METAR KLGA 191451Z 09024G31KT 2 1/2SM RA BR BKN009
 OVC013 14/14 A2960 RMK AO2 PK WND 09031/1450 SLP023 6//// T01440139 58017
 PNO \$ (DQ)
 10/19/96 09:55:30 METAR KLGA 191451Z COR 09024G31KT 2 1/2SM RA BR BKN009
 OVC013 14/14 A2960 RMK AO2 PK WND 09031/1450 SLP023 60025 T01440139 58017
 PNO \$ (DQ)
 10/19/96 10:52:29 METAR KLGA 191551Z 08025G30KT 2SM RA BR OVC012 15/14
 A2959 RMK AO2 PK WND 08036/1508 TWR VIS 2 1/2 PRESFR SLP018
 R04/5500VP6000FT T01500144 PNO \$ (DQ)
 10/19/96 11:52:34 METAR KLGA 191651Z 08023G38KT 2SM RA BR BKN012 BKN018
 OVC022 16/14 A2954 RMK AO2 PK WND 07038/1647 TWR VIS 2 1/2 PRESFR SLP003
 T01560144 PNO \$ (DQ)
 10/19/96 12:52:47 METAR KLGA 191751Z 08023G35KT 2 1/2SM RA BR OVC014 15/14
 A2950 RMK AO2 PK WND 09038/1654 SFC VIS 3 PRESFR SLP990 6//// T01500144
 10156 20139 58031 PNO \$ (DQ)
 10/19/96 12:54:30 METAR KLGA 191751Z COR 08023G35KT 2 1/2SM RA BR OVC014
 15/14 A2950 RMK AO2 PK WND 09038/1654 SFC VIS 3 PRESFR SLP990 60093
 T01500144 10156 20139 58031 PNO \$ (DQ)
 10/19/96 13:52:26 METAR KLGA 191851Z 08025G36KT 2 1/2SM RA BR OVC013 15/14
 A2948 RMK AO2 PK WND 08040/1816 SLP982 T01500144 PNO \$ (DQ)
 10/19/96 14:52:33 METAR KLGA 191951Z 08014G22KT 1 1/4SM +RA BR BKN013
 OVC019 14/14 A2950 RMK AO2 PK WND 07034/1917 TWR VIS 2 1/2 PRESRR SLP990
 R04/4000VP6000FT T01440144 PNO \$ (DQ)
 10/19/96 15:28:26 SPECI KLGA 192027Z 08014KT 3/4SM +RA BR BKN008 OVC013
 14/14 A2949 RMK AO2 TWR VIS 2 1/2 PRESFR R04/4000V4500FT PNO \$ (DQ)
 10/19/96 15:35:27 SPECI KLGA 192034Z 09012KT 1/2SM +RA FG BKN008 BKN011
 OVC019 14/14 A2950 RMK AO2 TWR VIS 2 1/2 PRESFR R04/4000V4500FT PNO \$ (DQ)
 10/19/96 15:52:30 METAR KLGA 192051Z 07013KT 1SM +RA BR BKN008 BKN011
 OVC019 14/14 A2950 RMK AO2 TWR VIS 2 1/2 PRESFR SLP990 R04/4000V4500FT
 6//// T01440144 56005 PNO \$ (DQ)
 10/19/96 15:59:27 METAR KLGA 192051Z COR 07013KT 1SM +RA BR BKN008 BKN011
 OVC019 14/14 A2950 RMK AO2 TWR VIS 2 1/2 PRESFR SLP990 R04/4000V5000FT
 60137 T01440144 56005 PNO \$ (DQ)
 10/19/96 16:06:26 SPECI KLGA 192105Z 06012KT 1 1/2SM +RA BR FEW005 BKN010
 OVC015 14/14 A2950 RMK AO2 TWR VIS 2 1/2 PNO \$ (DQ)
 10/19/96 16:08:30 SPECI KLGA 192105Z COR 06012KT 1 1/2SM +RA BR FEW005
 BKN010 OVC015 14/14 A2950 RMK AO2 TWR VIS 2 1/2 R04/3500V4500FT PNO \$ (DQ)
 10/19/96 16:52:28 METAR KLGA 192151Z 08016G23KT 2SM RA BR FEW003 SCT008
 OVC016 14/14 A2949 RMK AO2 SLP986 R04/5000V6000FT T01390139 PNO \$ (DQ)
 10/19/96 17:52:33 METAR KLGA 192251Z 06014KT 2SM -RA SCT005 OVC015 14/
 A2949 RMK AO2 SLP988 T0144 PNO \$ (DQ)
 10/19/96 17:58:28 METAR KLGA 192251Z COR 06014KT 2SM -RA BR SCT005 OVC015
 14/14 A2949 RMK AO2 SLP988 T01440140 PNO \$

Incident @
 2039Z
 1539Z

9

10/19/96 17:59:15 DQ LOGGED OFF AS OBSERVER FROM OID#1
10/19/96 17:59:47 DQ LOGGED ON AS OBSERVER FROM OID#1
10/19/96 18:52:27 METAR KLGA 192351Z 08015G25KT 2SM -RA BR SCT005 OVC015
14/14 A2950 RMK AO2 SLP988 6//// TO1440144 10161 20139 53004 PNO \$ (DQ)
10/19/96 18:53:28 METAR KLGA 192351Z COR 08015G25KT 2SM -RA BR SCT005
OVC015 14/14 A2950 RMK AO2 SLP988 60239 TO1440144 10161 20139 53004 PNO \$
(DQ)
10/19/96 18:54:27 SPECI KLGA 192353Z 2SM -RA SCT005 OVC015 A2950 RMK AO2
PNO \$ (DQ)
10/19/96 19:52:26 METAR KLGA 200051Z 08012G20KT 1 1/2SM RA BR SCT005
OVC010 14/14 A2950 RMK AO2 SLP988 TO1390139 PNO \$ (DQ)
10/19/96 20:52:32 METAR KLGA 200151Z 08010G20KT 2SM -RA BR SCT005 OVC015
14/14 A2956 RMK AO2 PRESRR SLP008 TO1390139 PNO \$ (DQ)
10/19/96 21:52:26 METAR KLGA 200251Z 20010KT 3SM -RA BR SCT005 SCT010
OVC015 14/14 A2958 RMK AO2 SLP016 6//// TO1390139 53029 PNO \$ (DQ)
10/19/96 21:56:29 METAR KLGA 200251Z COR 20010KT 3SM -RA BR SCT005 SCT010
OVC015 14/14 A2958 RMK AO2 SLP016 60030 TO1390139 53029 PNO \$ (DQ)
10/19/96 22:52:36 METAR KLGA 200351Z 21008KT 4SM -RA BR FEW005 BKN015
OVC020 11/10 A2960 RMK AO2 SLP023 TO1100095 PNO \$ (DQ)
10/19/96 23:04:32 DQ LOGGED OFF AS OBSERVER FROM OID#1
10/19/96 23:04:32 TC LOGGED ON AS OBSERVER FROM OID#1
10/19/96 23:52:28 METAR KLGA 200451Z 00000KT 8SM -RA FEW005 BKN015 OVC020
10/09 A2960 RMK AO2 RAE17B50 SLP022 TO1000089 401610100 PNO \$ (TC)
OBS LISTING COMPLETE, 50 OBS(S) LISTED.

CMD>

10

10/19/1996 14:49 EDIT-ENTRY KLGA 191949Z 08016G22KT 1SM +RA BR BKN013 OVC019 14/14 A2950 RMK A02 PK WND 07034/1917 PRESRR SLP988 T01440139 PNO \$ (DQ)
10/19/1996 14:49 EDIT-EXIT KLGA 191949Z 09014G22KT 1SM +RA BR BKN013 OVC019 14/14 A2950 RMK A02 PK WND 07034/1917 PRESRR SLP988 R04/4000VP6000FT T01440139 PNO \$ (DQ)

10/19/1996 14:55 EDIT-ENTRY KLGA 191955Z 09015G23KT 1 1/4SM +RA BR SCT009 OVC015 14/14 A2950 RMK A02 TWR VIS 2 1/2 PNO \$ (DQ)

10/19/1996 14:55 EDIT-EXIT KLGA 191955Z 09015G23KT 1 1/4SM +RA BR OVC013 14/14 A2950 RMK A02 TWR VIS 2 1/2 PNO \$ (DQ)

10/19/1996 14:58 EDIT-ENTRY KLGA 191958Z 10017G23KT 1SM +RA BR OVC013 14/14 A2951 RMK A02 TWR VIS 2 1/2 PNO \$ (DQ)

10/19/1996 14:58 EDIT-EXIT KLGA 191958Z 10017G23KT 1 1/4SM +RA BR OVC013 14/14 A2951 RMK A02 TWR VIS 2 1/2 PNO \$ (DQ)

10/19/1996 15:24 EDIT-ENTRY KLGA 192024Z 08017KT 1 1/4SM +RA BR OVC013 14/14 A2950 RMK A02 TWR VIS 2 1/2 PRESFR PNO \$ (DQ)

10/19/1996 15:26 EDIT-EXIT KLGA 192026Z 09016KT 3/4SM +RA BR BKN007 OVC013 14/14 A2950 RMK A02 TWR VIS 2 1/2 PRESFR R04/4000V4500FT PNO \$ (DQ)

10/19/1996 15:33 EDIT-ENTRY KLGA 192033Z 09013KT 3/4SM +RA BR SCT006 BKN011 OVC019 14/14 A2951 RMK A02 TWR VIS 2 1/2 PRESFR R04/4000V4500FT PNO \$ (DQ)

10/19/1996 15:33 EDIT-EXIT KLGA 192033Z 09013KT 3/4SM +RA BR BKN008 BKN011 OVC019 14/14 A2951 RMK A02 TWR VIS 2 1/2 PRESFR R04/4000V4500FT PNO \$ (DQ)

10/19/1996 15:50 EDIT-ENTRY KLGA 192050Z 07013KT 1SM +RA BR BKN008 BKN011 OVC019 14/14 A2950 RMK A02 TWR VIS 2 1/2 PRESFR SLP990 R04/4000V4500FT 6//// T01440144 56005 PNO \$ (DQ)

10/19/1996 15:51 EDIT-EXIT KLGA 192051Z 07013KT 1SM +RA BR BKN008 BKN011 OVC019 14/14 A2950 RMK A02 TWR VIS 2 1/2 PRESFR SLP990 R04/4000V5000FT 6//// T01440144 56005 PNO \$ (DQ)

10/19/1996 15:51 EDIT-ENTRY KLGA 192051Z 07013KT 1SM +RA BR BKN008 BKN011 OVC019 14/14 A2950 RMK A02 TWR VIS 2 1/2 PRESFR SLP990 R04/4000V5000FT 6//// T01440144 56005 PNO \$ (DQ)

10/19/1996 15:51 EDIT-EXIT KLGA 192051Z 07013KT 1SM +RA BR FEW008 OVC011 14/14 A2950 RMK A02 TWR VIS 2 1/2 PRESFR SLP990 R04/4000V5000FT 6//// T01440144 56005 PNO \$ (DQ)

10/19/1996 15:52 EDIT-ENTRY KLGA 192052Z 07014KT 3/4SM +RA BR BKN011 BKN013 OVC021 14/14 A2950 RMK A02 TWR VIS 2 1/2 PNO \$ (DQ) ← after 15:52:23

10/19/1996 15:52 EDIT-EXIT KLGA 192052Z 07014KT 1SM +RA BR BKN008 BKN013 OVC021 14/14 A2950 RMK A02 TWR VIS 2 1/2 PNO \$ (DQ)

10/19/1996 16:02 EDIT-ENTRY KLGA 192102Z 06013KT 1SM +RA BR BKN008 BKN013 OVC021 14/14 A2950 RMK A02 TWR VIS 2 1/2 PNO \$ (DQ)

10/19/1996 16:03 EDIT-EXIT KLGA 192103Z 06013KT 1 1/4SM +RA BR FEW005 OVC010 14/14 A2950 RMK A02 TWR VIS 2 1/2 PNO \$ (DQ)

10/19/1996 16:05 EDIT-ENTRY KLGA 192105Z 06012KT 1 1/2SM +RA BR FEW005 BKN010 OVC015 14/14 A2950 RMK A02 TWR VIS 2 1/2 PNO \$ (DQ)

10/19/1996 16:05 EDIT-EXIT KLGA 192106Z 07012KT 1 1/2SM +RA BR FEW005 BKN010 OVC015 14/14 A2949 RMK A02 TWR VIS 2 1/2 PNO \$ (DQ)

10/19/1996 16:10 EDIT-ENTRY KLGA 192110Z 06012KT 1 1/4SM +RA BR FEW005 BKN012 OVC024 14/14 A2950 RMK A02 TWR VIS 2 1/2 PNO \$ (DQ)

10/19/1996 16:10 EDIT-EXIT KLGA 192110Z 06011KT 1 1/2SM +RA BR FEW005 BKN012 OVC024 14/14 A2950 RMK A02 TWR VIS 2 1/2 PNO \$ (DQ)

10/19/1996 16:22 EDIT-ENTRY KLGA 192123Z 07010KT 1 1/2SM +RA BR SCT005 BKN012 OVC024 14/14 A2949 RMK A02 TWR VIS 2 1/2 PNO \$ (DQ)

10/19/1996 16:24 EDIT-EXIT KLGA 192124Z 07010KT 1 1/2SM +RA BR SCT005 BKN012 OVC024 14/14 A2949 RMK A02 TWR VIS 2 1/2 PNO \$ (DQ)

10/19/1996 16:24 EDIT-ENTRY KLGA 192124Z 07010KT 1 1/2SM +RA BR BKN005 BKN012 OVC026 14/14 A2949 RMK A02 TWR VIS 2 1/2 PNO \$ (DQ)

10/19/1996 16:24 EDIT-EXIT KLGA 192124Z 07010KT 1 1/2SM +RA BR FEW005 BKN012 OVC026 14/14 A2949 RMK A02 TWR VIS 2 1/2 PNO \$ (DQ)

10/19/96 16:32 *ST 0808 DCP #1 UPS #1 Is On Battery Power

10/19/1996 16:45 EDIT-ENTRY KLGA 192145Z 08014KT 1 1/2SM RA BR FEW005 BKN012 OVC026 14/14 A2949 RMK A02 TWR VIS 2 1/2 SLP987 T01390139 PNO \$ (DQ)

10/19/1996 16:45 EDIT-EXIT KLGA 192145Z 07014KT 2SM RA BR SCT005 BKN012 OVC019

VC018 14/14 A2950 RMK A02 SLP988 T01390139 PNO \$ (DQ) (3)
10/19/1996 16:48 EDIT-EXIT KLGA 192148Z 07017G23KT 2 1/2SM RA BR SCT005 BKN014
DVC018 14/14 A2949 RMK A02 SLP987 R04/5000V6000FT T01390139 PNO \$ (DQ)
10/19/1996 16:49 EDIT-ENTRY KLGA 192149Z 08018G23KT 3SM RA BR FEW003 SCT008 OV
C016 14/14 A2949 RMK A02 SLP987 R04/5000V6000FT T01390139 PNO \$ (DQ)
10/19/1996 16:49 EDIT-EXIT KLGA 192149Z 08018G23KT 2SM RA BR FEW003 SCT008 OVC
O16 14/14 A2949 RMK A02 SLP987 R04/5000V6000FT T01390139 PNO \$ (DQ)
10/19/1996 16:52 EDIT-ENTRY KLGA 192152Z 08017G23KT 3SM RA BR FEW006 BKN013 OV
C018 14/14 A2949 RMK A02 PNO \$ (DQ)
10/19/1996 16:52 EDIT-EXIT KLGA 192152Z 07018G23KT 3SM RA BR FEW003 SCT008 OVC
O16 14/14 A2949 RMK A02 PNO \$ (DQ)
10/19/1996 16:52 EDIT-ENTRY KLGA 192152Z 07018G23KT 3SM RA BR FEW003 SCT008 OV
C016 14/14 A2949 RMK A02 PNO \$ (DQ)
10/19/1996 16:53 EDIT-EXIT KLGA 192153Z 07018G23KT 2SM RA BR FEW003 SCT008 OVC
O16 14/14 A2949 RMK A02 PNO \$ (DQ)

10/19/96 16:56 *ST 1000 Ceilometer #1 Hardware Alarm (See Site Technical Manual for Ceilometer)

10/19/96 16:56 *ST 1012 Ceilometer #1 Data Quality Bad

RES LOGGED ON AS TECHNICIAN FROM OID#4 ON 10/19/96 AT 16:57:47

10/19/96 17:00 *ST 0822 DCP #1 UPS #1 Low Battery

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13

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$\bar{X}_0 = 2.1482$
 $\bar{V}_0 = 0.85 \text{ sm}$
 $V = 1 \text{ sm}$

$\bar{X}_{10} = 2.2354$
 $\bar{V}_{10} = 0.818 \text{ sm}$
 $V = 1 \text{ sm}$

$\bar{X}_{10} = 2.3654$
 $\bar{V}_{10} = 0.77$
 $V = 3/4 \text{ sm}$

1549:00	1.931 D	1.248 N	1.675 D	66	15	62	15	a01
00000000000000000000000000000000								
1550:00	2.370 D	1.788 N	2.044 D	70	14	76	14	a01 070/14KT.
00000000000000000000000000000000								
1551:00	3.125 D	2.125 N	2.346 D	73	13	73	15	a01 070/13KT.
00000000000000000000000000000000								
1552:00	3.714 D	2.358 N	2.556 D	72	14	74	15	a01
00000000000000000000000000000000								
1553:00	3.977 D	2.528 N	3.265 D	69	14	69	15	a01
00000000000000000000000000000000								
1554:00	3.891 N	3.101 N	3.579 D	68	13	66	14	a01
00000000000000000000000000000000								
1555:00	3.526 N	3.070 N	3.471 D	65	13	65	14	a01
00000000000000000000000000000000								
1556:00	3.142 N	2.929 N	2.951 D	66	13	63	14	a01
00000000000000000000000000000000								
1557:00	3.269 N	3.193 N	2.850 N	67	14	76	17	a01
00000000000000000000000000000000								
1558:00	3.454 N	3.131 N	2.942 D	67	15	61	16	a01
00000000000000000000000000000000								
1559:00	2.857 N	2.701 N	2.974 D	65	14	62	16	a01
00000000000000000000000000000000								
1600:00	2.597 N	2.509 D	2.415 D	62	14	61	15	a01
00000000000000000000000000000000								
1601:00	2.514 N	2.639 D	2.431 D	61	14	65	15	a01
00000000000000000000000000000000								
1602:00	2.185 N	2.386 D	2.262 D	60	13	51	14	a01
00000000000000000000000000000000								
1603:00	2.247 N	2.238 D	1.987 D	60	13	63	14	a01
00000000000000000000000000000000								
1604:00	1.938 N	1.905 D	1.943 D	62	13	64	14	a01
00000000000000000000000000000000								
1605:00	1.870 N	1.544 D	1.781 D	61	12	55	13	a01
00000000000000000000000000000000								
1606:00	1.762 N	1.562 D	1.804 D	68	12	83	14	a01
00000000000000000000000000000000								
1607:00	1.837 D	1.788 D	1.612 D	76	13	78	15	a01
00000000000000000000000000000000								
1608:00	2.293 D	1.865 D	1.589 D	69	13	71	14	a01
00000000000000000000000000000000								
1609:00	2.056 D	1.801 D	2.015 D	61	12	66	14	a01
00000000000000000000000000000000								
1610:00	1.756 D	1.607 D	1.736 D	60	12	66	12	a01
00000000000000000000000000000000								
1611:00	1.826 D	1.533 D	1.580 D	63	12	65	12	a01

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$T = 58.4^\circ\text{F}$ $T_d = 57.4^\circ\text{F}$
 $58^\circ\text{F}/14.4^\circ\text{C}$ $57^\circ\text{F}/13.9^\circ\text{C}$ (14)

$$T_{dL} = 57.4F - 13.9(4)$$

17

Time	Lat	Long	Alt	Speed	Heading	Roll	Pitch	Yaw	Roll Rate	Pitch Rate	Yaw Rate
1504:00	R+	0.00	29.479 29.472 29.480	59	58	b91					
1505:00	R+	0.00	29.479 29.472 29.480	59	58	b91	58.6F	57.8F			
1506:00	R+	0.00	29.477 29.471 29.478	59	58	b91	59F-15C	58F = 14.4C/AC			
1507:00	--	--	--	--	--	--					
1508:00	--	--	--	--	--	--					
1509:00	--	--	--	--	--	--					
1510:00	--	--	--	--	--	--					
1511:00	--	--	--	--	--	--					
1512:00	--	--	--	--	--	--					
1513:00	--	--	--	--	--	--					
1514:00	--	--	--	--	--	--					
1515:00	--	--	--	--	--	--					
1516:00	--	--	--	--	--	--					
1517:00	R+	0.00	29.458 29.451 29.459	58	58	a01					
1518:00	R+	0.00	29.457 29.451 29.458	58	58	a01					
1519:00	R+	0.00	29.455 29.449 29.456	58	57	a01					
1520:00	R+	0.00	29.453 29.447 29.454	58	57	a01					
1521:00	R+	0.00	29.453 29.447 29.454	58	58	a01					
1522:00	R+	0.00	29.454 29.448 29.455	58	57	a01					
1523:00	R+	0.00	29.456 29.450 29.457	58	58	a01					
1524:00	R+	0.00	29.458 29.452 29.460	58	58	a01					
1525:00	R+	0.00	29.458 29.452 29.459	58	58	a01	58F/14.4C (14C)	57.8F 58F = 14.4C(14C)			
1526:00	R+	0.00	29.456 29.450 29.457	57	57	a01					

1527:00 R+ 0.00 29.456 29.449 29.457 58 58 a01

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1528:00 R+ 0.00 29.457 29.451 29.458 58 58 a01

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1529:00 R+ 0.00 29.461 29.455 29.462 58 58 a01

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1530:00 R+	0.00	29.467	29.461	29.468	58	58	a01
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1531:00 R+ 0.00 29.472 29.466 29.473 58 58 a01

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1532:00 R+ 0.00 29.474 29.468 29.475 58 58 a01

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1533:00 R+	0.00	29.471	29.464	29.472	58	58	801
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1534:00 R+ 0.00 29.466 29.459 29.467 57 58 a01

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1535:00 R+ 0.00 29.459 29.453 29.460 57 58 801

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1536.00 R+ -0.00 29.455 29.449 29.456 57 58 801

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1537:00 R+ 0.00 29.452 29.446 29.453 58 58 801

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1538:00 R+ 0.00 29.447 29.441 29.448 58 58 a01

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1539:00 R+ 0.00 29.445 29.439 29.446 58 58 a01

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1540:00 R+ 0.00 29.445 29.438 29.446 58 58 a013

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1541:00 R+ 0.00 29.440 29.433 29.441 58 58 a01

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1542:00 R+ 0.00 29.438 29.432 29.439 58 58 a01

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1543:00 R+ 0.00 29.441 29.434 29.442 58 58 a01

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1544:00 R+ 0.00 29.446 29.439 29.447 58 58 a01

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1545:00 R+ 0.00 29.449 29.443 29.450 58 58 a01

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1546:00 R+ 0.00 29.453 29.447 29.454 58 58 a01

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1547.00 R+ 0.00 29.458 29.452 29.459 58 58 a01

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1548:00 R+ 0.00 29.461 29.454 29.462 58 58 a01

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SYSLOG 1019 0000 1020 0000 CODE1 CODE2
ILLEGAL DATE/TIME/CODE/RANGE SPECIFIED.
CMD>SYSLOG 1019 0000 1020 0000
PREPARE TO RECEIVE IN 10 SECONDS
LISTING SYSLOGS FROM: 10/19/1996 00:00 THRU 10/20/1996 00:00
10/19/96 00:00 *SY 9999 CALLS ON PHONE LINES: LINE #1 8 CALLS LINE
#2 0 CALLS LINE #3 0 CALLS LINE #4 0 CALLS LINE #5 0 CALLS LINE
#6 0 CALLS LINE #7 0 CALLS LINE #8 0 CALLS
10/19/96 00:00 *SY 9999 AOMC CALLS TODAY: 0, AOMC SUCCESSFUL CALLS TODAY:
0
10/19/96 03:32 *ST 1650 HO83 SENSOR SENSOR RESPONSE TIMEOUT
10/19/96 03:32 *ST 2741 CUMULATIVE PRECIPITATION SENSOR READING MISSING
10/19/96 03:32 *ST 1652 HO83 SENSOR TEMPERATURE DATA QUALITY ERROR
10/19/96 03:32 *ST 1653 HO83 SENSOR DEWPOINT DATA QUALITY ERROR
10/19/96 03:32 *ST 2727 WIND SENSOR IS INOPERATIONAL
10/19/96 03:32 *ST 2212 ACU/DCP COMMS FAILED. CHECK DCP #1 (SEE
MAINTENANCE MANUAL)
10/19/96 03:33 *ST 2790 PHOTOMETER INOPERATIVE SENSOR #1: READING IS
MISSING - READINGS ARE RESET TO DAY FOR CALCULATIONS
10/19/96 03:33 *ST 2792 PHOTOMETER INOPERATIVE SENSOR #3: READING IS
MISSING - READINGS ARE RESET TO DAY FOR CALCULATIONS
10/19/96 03:33 *ST 2736 CEILOMETER #1 IS INOPERATIVE
10/19/96 03:33 *ST 2738 CEILOMETER #3 IS INOPERATIVE
10/19/96 03:33 *ST 2745 TEMPERATURE SENSOR IS INOPERATIONAL
10/19/96 03:33 *ST 2741 CUMULATIVE PRECIPITATION SENSOR READING MISSING
10/19/96 03:33 *ST 1012 CEILOMETER #1 DATA QUALITY BAD - *PRIMARY*
10/19/96 03:33 *ST 1014 CEILOMETER #3 DATA QUALITY BAD - *BACKUP*
10/19/96 03:33 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 03:34 *ST 2732 PRESENT WEATHER INOPERATIVE
10/19/96 03:34 *ST 2741 CUMULATIVE PRECIPITATION SENSOR READING MISSING
10/19/96 03:34 *ST 2230 DCP 1 HAS RESET TO BOOT PROMS
10/19/96 03:35 *ST 1200 LEDWI PRESENT WEATHER SENSOR RESPONSE TIMEOUT
(CHECK POWER SUPPLY FRU, THEN FIBER OPTIC FRU, THEN MICROPROCESSOR BOARD
FRU)
10/19/96 03:35 *ST 1213 LEDWI PRESENT WEATHER SENSOR DATA QUALITY ERROR
10/19/96 03:35 *ST 2703 VISIBILITY SENSOR #1 NOT OPERATIONAL: TOO MANY
MISSING VALUES - 10 MIN AVERAGE IS MARKED MISSING
10/19/96 03:35 *ST 2705 VISIBILITY SENSOR #3 NOT OPERATIONAL: TOO MANY
MISSING VALUES - 10 MIN AVERAGE IS MARKED MISSING
10/19/96 03:35 *ST 2741 CUMULATIVE PRECIPITATION SENSOR READING MISSING
10/19/96 03:35 *ST 1015 CEILOMETER #1 SENSOR RESPONSE TIMEOUT (CHECK
FIBER OPTIC FRU, THEN SEE SITE TECHNICAL MANUAL FOR CEILOMETER)
10/19/96 03:35 *ST 1017 CEILOMETER #3 SENSOR RESPONSE TIMEOUT (CHECK
FIBER OPTIC FRU, THEN SEE SITE TECHNICAL MANUAL FOR CEILOMETER)
10/19/96 03:35 *ST 1550 WIND SENSOR SENSOR RESPONSE TIMEOUT (CHECK FIBER
OPTIC FRU, THEN DIRECTION SENSOR FRU, THEN POWER SUPPLY MODULE FRU)
10/19/96 03:35 *ST 1572 WIND SENSOR DATA QUALITY CHECK ERROR

10/19/96 03:35 *ST 1250 VISIBILITY SENSOR #1 SENSOR V2 RESPONSE TIMEOUT
 (CHECK FIBER OPTIC FRU)
 10/19/96 03:35 *ST 1388 VISIBILITY SENSOR #1 VISIBILITY DATA QUALITY
 FAILURE
 10/19/96 03:35 *ST 1252 VISIBILITY SENSOR #3 SENSOR V2 RESPONSE TIMEOUT
 (CHECK FIBER OPTIC FRU)
 10/19/96 03:35 *ST 1390 VISIBILITY SENSOR #3 VISIBILITY DATA QUALITY
 FAILURE
 10/19/96 03:36 *ST 2733 PRESENT WEATHER SENSOR IS OPERATIONAL
 10/19/96 03:36 *ST 0857 DCP #1 UPS #1 WATCHDOG TIMER TIMEOUT
 10/19/96 03:36 *ST 1253 VISIBILITY SENSOR #1 SENSOR VG RESPONSE TIMEOUT
 (CHECK FIBER OPTIC FRU)
 10/19/96 03:36 *ST 2206 ACU RADIO/LINE DRIVER B COMMS FAILED
 10/19/96 03:36 *ST 1255 VISIBILITY SENSOR #3 SENSOR VG RESPONSE TIMEOUT
 (CHECK FIBER OPTIC FRU)
 10/19/96 03:37 *ST 2783 WIND SENSOR OPERATIONAL
 10/19/96 03:41 *ST 2744 TEMPERATURE SENSOR IS OPERATIONAL
 10/19/96 03:41 *ST 2797 DEWPOINT TEMPERATURE IS OPERATIONAL
 10/19/96 03:45 *ST 2706 VISIBILITY SENSOR #1 IS FULLY OPERATIONAL - *Primary*
 10/19/96 03:45 *ST 2708 VISIBILITY SENSOR #3 IS FULLY OPERATIONAL - *Backup*
 10/19/96 04:05 *ST 2752 CEILOMETER #1 IS OPERATIVE
 10/19/96 04:05 *ST 2754 CEILOMETER #3 IS OPERATIVE
 10/19/96 06:00 *ST 9999 ACU SIO TRANSMISSION FAILS FOR PAST 24 HOURS -
 CARD #4: PORT #3 = 3.
 10/19/96 08:43 *ST 2798 CUMULATIVE PRECIPITATION IS INOPERATIVE
 10/19/96 08:43 *ST 2799 CUMULATIVE PRECIPITATION DATA QUALITY ERROR
 10/19/96 16:32 *ST 0808 DCP #1 UPS #1 IS ON BATTERY POWER
 10/19/96 16:56 *ST 1000 CEILOMETER #1 HARDWARE ALARM (SEE SITE TECHNICAL
 MANUAL FOR CEILOMETER)
 10/19/96 16:56 *ST 1012 CEILOMETER #1 DATA QUALITY BAD
 10/19/96 16:57 RES 9999 RES LOGGED ON AS TECHNICIAN FROM OID#4
 10/19/96 17:00 *ST 0822 DCP #1 UPS #1 LOW BATTERY
 10/19/96 17:05 RES 9999 RES LOGGED OFF AS TECHNICIAN FROM OID#4
 10/19/96 17:38 *ST 2790 PHOTOMETER INOPERATIVE SENSOR #1: READING IS
 MISSING - READINGS ARE RESET TO DAY FOR CALCULATIONS
 10/19/96 17:38 *ST 2792 PHOTOMETER INOPERATIVE SENSOR #3: READING IS
 MISSING - READINGS ARE RESET TO DAY FOR CALCULATIONS
 10/19/96 17:38 *ST 1650 HO83 SENSOR SENSOR RESPONSE TIMEOUT
 10/19/96 17:38 *ST 2727 WIND SENSOR IS INOPERATIONAL
 10/19/96 17:38 *ST 1652 HO83 SENSOR TEMPERATURE DATA QUALITY ERROR
 10/19/96 17:38 *ST 1653 HO83 SENSOR DEWPOINT DATA QUALITY ERROR
 10/19/96 17:38 *ST 2738 CEILOMETER #3 IS INOPERATIVE

1539LST →

10/19/96 17:38 *ST 1014 CEILOMETER #3 DATA QUALITY BAD
10/19/96 17:38 *ST 2212 ACU/DCP COMMS FAILED. CHECK DCP #1 (SEE
MAINTENANCE MANUAL)
10/19/96 17:39 *ST 2745 TEMPERATURE SENSOR IS INOPERATIONAL
10/19/96 17:39 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 17:40 *ST 2703 VISIBILITY SENSOR #1 NOT OPERATIONAL: TOO MANY
MISSING VALUES - 10 MIN AVERAGE IS MARKED MISSING
10/19/96 17:40 *ST 2705 VISIBILITY SENSOR #3 NOT OPERATIONAL: TOO MANY
MISSING VALUES - 10 MIN AVERAGE IS MARKED MISSING
10/19/96 17:40 *ST 2732 PRESENT WEATHER INOPERATIVE
10/19/96 17:41 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 17:43 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 17:45 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 17:46 *ST 2737 CEILOMETER #2 IS INOPERATIVE
10/19/96 17:46 *ST 1013 CEILOMETER #2 DATA QUALITY BAD
10/19/96 17:47 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 17:49 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 17:51 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 17:53 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 17:55 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 17:57 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 17:59 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 18:01 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 18:03 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 18:05 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 18:07 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 18:09 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 18:11 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 18:13 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 18:15 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 18:17 *ST 2234 RADIO COMMUNICATIONS ARE IN A HARD FAILURE STATE
10/19/96 18:39 *ST 2791 PHOTOMETER INOPERATIVE SENSOR #2: READING IS
MISSING - READINGS ARE RESET TO DAY FOR CALCULATIONS
10/19/96 19:22 ZZZ 9999 ZZZ LOGGED ON AS TECHNICIAN FROM OID#4
10/19/96 19:27 *ST 2791 PHOTOMETER INOPERATIVE SENSOR #2: READING IS
MISSING - READINGS ARE RESET TO DAY FOR CALCULATIONS
10/19/96 19:28 ZZZ 9999 ZZZ LOGGED OFF AS TECHNICIAN FROM OID#4

23

10/19/96 19:41 ZZZ 9999 ZZZ LOGGED ON AS TECHNICIAN FROM OID#4
 10/19/96 19:54 ZZZ 9999 ZZZ LOGGED OFF AS TECHNICIAN FROM OID#4
 10/19/96 21:43 *ST 2791 PHOTOMETER INOPERATIVE SENSOR #2: READING IS
 MISSING - READINGS ARE RESET TO DAY FOR CALCULATIONS
 10/19/96 21:59 *ST 2791 PHOTOMETER INOPERATIVE SENSOR #2: READING IS
 MISSING - READINGS ARE RESET TO DAY FOR CALCULATIONS
 10/19/96 22:57 *ST 2230 DCP 1 HAS RESET TO BOOT PROMS
 10/19/96 22:58 *ST 1200 LEDWI PRESENT WEATHER SENSOR RESPONSE TIMEOUT
 (CHECK POWER SUPPLY FRU, THEN FIBER OPTIC FRU, THEN MICROPROCESSOR BOARD
 FRU)
 10/19/96 22:58 *ST 1213 LEDWI PRESENT WEATHER SENSOR DATA QUALITY ERROR
 10/19/96 22:58 *ST 1015 CEILOMETER #1 SENSOR RESPONSE TIMEOUT (CHECK
 FIBER OPTIC FRU, THEN SEE SITE TECHNICAL MANUAL FOR CEILOMETER)
 10/19/96 22:58 *ST 1017 CEILOMETER #3 SENSOR RESPONSE TIMEOUT (CHECK
 FIBER OPTIC FRU, THEN SEE SITE TECHNICAL MANUAL FOR CEILOMETER)
 10/19/96 22:58 *ST 0857 DCP #1 UPS #1 WATCHDOG TIMER TIMEOUT
 10/19/96 22:58 *ST 1550 WIND SENSOR SENSOR RESPONSE TIMEOUT (CHECK FIBER
 OPTIC FRU, THEN DIRECTION SENSOR FRU, THEN POWER SUPPLY MODULE FRU)
 10/19/96 22:58 *ST 1572 WIND SENSOR DATA QUALITY CHECK ERROR
 10/19/96 22:58 *ST 1250 VISIBILITY SENSOR #1 SENSOR V2 RESPONSE TIMEOUT
 (CHECK FIBER OPTIC FRU)
 10/19/96 22:58 *ST 1388 VISIBILITY SENSOR #1 VISIBILITY DATA QUALITY
 FAILURE
 10/19/96 22:58 *ST 1252 VISIBILITY SENSOR #3 SENSOR V2 RESPONSE TIMEOUT
 (CHECK FIBER OPTIC FRU)
 10/19/96 22:58 *ST 1390 VISIBILITY SENSOR #3 VISIBILITY DATA QUALITY
 FAILURE
 10/19/96 22:59 *ST 1253 VISIBILITY SENSOR #1 SENSOR VG RESPONSE TIMEOUT
 (CHECK FIBER OPTIC FRU)
 10/19/96 22:59 *ST 1255 VISIBILITY SENSOR #3 SENSOR VG RESPONSE TIMEOUT
 (CHECK FIBER OPTIC FRU)
 10/19/96 23:00 *ST 1211 LEDWI PRESENT WEATHER SENSOR FRU #1 ERROR CODE
 (REPLACE HEADPIECE FRU)
 10/19/96 23:00 *ST 1214 LEDWI PRESENT WEATHER SENSOR SOFTWARE RESET
 OCCURRED
 10/19/96 23:00 *ST 0864 DCP #1 UPS #1 AC POWER RESTORED
 10/19/96 23:00 *ST 2783 WIND SENSOR OPERATIONAL
 10/19/96 23:04 *ST 2744 TEMPERATURE SENSOR IS OPERATIONAL
 10/19/96 23:04 *ST 2797 DEWPOINT TEMPERATURE IS OPERATIONAL
 10/19/96 23:05 *ST 2733 PRESENT WEATHER SENSOR IS OPERATIONAL
 10/19/96 23:08 *ST 2706 VISIBILITY SENSOR #1 IS FULLY OPERATIONAL
 10/19/96 23:08 *ST 2708 VISIBILITY SENSOR #3 IS FULLY OPERATIONAL
 10/19/96 23:26 *ST 2753 CEILOMETER #2 IS OPERATIVE
 10/19/96 23:28 *ST 2752 CEILOMETER #1 IS OPERATIVE
 10/19/96 23:28 *ST 2754 CEILOMETER #3 IS OPERATIVE
 10/20/96 00:00 *SY 9999 CALLS ON PHONE LINES: LINE #1 7 CALLS LINE
 #2 0 CALLS LINE #3 0 CALLS LINE #4 0 CALLS LINE #5 0 CALLS LINE
 #6 0 CALLS LINE #7 0 CALLS LINE #8 0 CALLS

10/20/96 00:00 *SY 9999 AOMC CALLS TODAY: 0, AOMC SUCCESSFUL CALLS TODAY:
0
SYSLOG LISTING COMPLETE, 125 SYSLOG(S) LISTED.
CMD>BYE
GOODBYE!

25



U.S. Department
of Transportation
Federal Aviation
Administration

Memorandum

Subject: **INFORMATION:** LaGuardia International
Airport (LGA) Low Level Wind Shear Alert
System (LLWAS) Data Package for October 19

Date: November 18, 1996

From: Program Director, C/N/S Engineering and
Test Division, ACT-300

Reply to
Attn. of: Paul Biagi:

To: Manager, Airway Facilities Division, AEA-400

The following is in response to your memorandum dated October 23 requesting analysis of archived LLWAS data from LaGuardia International Airport (LGA). ACT-320 retrieved the data from October 19 during the time period 1600 - 2100Z, resulting in the attached printouts. Attached you will also find graphics data five minutes before and after an alarm for the indicated time period.

In addition, per this office's memorandum (Re: LaGuardia Int'l Airport (LGA) LLWAS Data Package for October 19) dated October 21, Site Performance Evaluation System (SPES) utilities were performed on archived LLWAS data during the time period of September 19 to October 19, and October 13 to October 19. The analysis indicated that three LLWAS sensors seem to have had problems during the analyzed period.

SPES has indicated a problem with Station 4. This station seems to be sheltered. Although not entirely conclusive, there also appears to be a possible hardware problem with the wind sensor at this remote station. If the sensor was partially sheltered, the average winds from sensor 4 would have been from the same direction as those of the Center Field (CF) sensor, but lower. However, the average wind direction, at certain bearings, deviated significantly from the CF sensor. This indicates a possible hardware problem, or a possible wind channeling problem. If this sensor were just misaligned, the average wind direction would have deviated for every degree at approximately the same value.

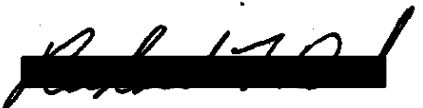
These problems with Station 4 may contribute to false windshear alerts. A false windshear alert occurs when a station triggers the LLWAS Six Sensor Improvement (LLWAS-SSI) Windshear/Microburst Detection (WSMD) Algorithm to issue an alert when wind conditions are not conducive to windshear.

26

These problems at the station may also cause the LLWAS to miss an alert by causing threshold values in the WSMD algorithm not to exceed limits needed for windshear alerts.

SPES also indicated problems with Remote Stations 3 and 5. These stations had wind speeds lower than the Centerfield Station which may be due to sheltering. These problems with Remote Stations 3 and 5 did not appear to degrade the system during the analyzed period.

If we can be of any further assistance, please contact me at [REDACTED]
Paul Biagi at [REDACTED] or Kelly Peterson at [REDACTED]


Richard F. Bock

Attachments

cc:

P. Biagi, ACT-320

P. Barbagallo, ACT-320 (w/o attachments)

D. Goreman, AOS-250 (w/o attachments)

W. Chin, AND-420 (w/o attachments)

Salottolo Greg

From: Theresa Payne [REDACTED]
Sent: Wednesday, April 16, 1997 4:45 PM
To: Salottolo Greg
Subject: Re: Response to 97-032 LGA LLWAS

----- Forwarded with Changes -----
From: William Baumann at aaf20
Date: 4/16/97 10:30AM
To: Theresa Payne at AAI
Subject: Re: Response to 97-032 LGA LLWAS

----- Forwarded with Changes -----
From: Charles Cassella at aea470
Date: 4/16/97 9:16AM
To: William Baumann at AAF20
***cc:** Selim Haber
***cc:** Peter Scotti
***cc:** Donald Bristol
Subject: Re: Response to 97-032 LGA LLWAS

Greg-

Attached is a response to your followup questions regarding the LGA LLWAS. Let me know if you need anything else.

Theresa Payne

----- Forward Header -----
Subject: Re: Response to 97-032 LGA LLWAS
Author: William Baumann at aaf20
Date: 4/16/97 10:30 AM

Theresa,

I apologize for the delay in responding to you on the NTSB request relating to 97-032. The information you requested is in the following message. Please let me know if this answers the NTSB request.

Thanks

Bill

----- Forward Header -----
Subject: Re: Response to 97-032 LGA LLWAS
Author: Charles Cassella at aea470
Date: 4/16/97 9:16 AM

Bill,

~~Page 1~~

28

I prepared this last week but got sidetracked before I could send it. Don is preparing the memo.
Charlie

You requested a response via CCMAIL with a memo as follow-up. The response provided below is an interim response. The official response will come under the division manager's signature. It may be different than what you see below.

Our response of March 26, 1997, answered the NTSB's question: "What has been done to correct the problems?"

Additional background and clarification is provided.

Although these stations were installed in accordance with approved criteria, at the time the system was established, it is apparent that the development of SPES has found some possible problems. As part of our continuing effort to provide the best information available on wind-shear, a project was developed to expand and improve the system. The schedule for that program was provided.

The attached message from Greg asks additional questions. I will attempt to answer them below.

Concerns were previously raised over the possibility of some stations not being ideally sited. The first concerns resulted in a memo by AOS-200, dated March 14, 1994. A second request for clarification was answered by AOS-200 on November 8, 1996. Both responses are consistent in recommending that the LLWAS remain in operation until new locations can be determined and installed. The rationale is that although there may be some false alerts and there may be some wind-shear not detected, wind-shear detection benefits are still being derived. We plan to continue to operate the LGA LLWAS in its current configuration until the system is modified this Fall.

Reply Separator

Subject: Response to 97-032 LGA LLWAS
Author: William Baumann at aaf20
Date: 4/9/97 9:51 AM

Charlie,

This is the information I forwarded to Don, thanks in advance for your assistance.

Bill

Forward Header

Subject: Response to 97-032 LGA LLWAS
Author: William Baumann at aaf20
Date: 4/4/97 7:41 AM

Page 2

29

Donald,

Your response to this message is needed today! Please forward your information to me via cc:mail, and follow it up with a Memo. If you have any questions, please call me at [REDACTED] thank you.

Your original memo. did not answer the questions being ask by the NTSB.

Bill Baumann

Forward Header

Subject: Response to 97-032 LGA LLWAS
Author: Theresa Payne at AAI
Date: 4/3/97 12:21 PM

Bill-

I received this message in response to the memo we sent over regarding the NTSB's request for information concerning the LLWAS at LaGuardia. It seems that the NTSB still has some concerns. How do you want to handle this?

Thanks, Theresa

Forward Header

Subject: Response to 97-032 LGA LLWAS
Author: Salottolo Greg [REDACTED]
Date: 4/3/97 12:19 PM

Theresa:

Received FAX response. Thank you.

We are still concerned about the current functionality of the LLWAS. The SPES utilities indicated a possible hardware problem with sensor #4. Has this problem as well as the problem with sensor #3 and #5 been addressed? How was it addressed?

Thanks ..

Greg ..

~~Page 2~~

30

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

*Washington Headquarters
Office of Accident Investigation*

FAX COVER SHEET

to: NTSBattention: Eug Salattolophone: [REDACTED]fax number: [REDACTED]from: Theresa Paynephone: [REDACTED]total pages (excluding this cover sheet): 1date of transmission: 4-3-97

Remarks/Delivery Instructions:

Response to 97-032.

This message transmitted by FAA, Office of Accident Investigation,
Washington, DC via:

Pitney Bowes 8000 FAX number: (202) 267-5043

To contact sender, call:

(202) 267-3120



U.S. Department
of Transportation
Federal Aviation
Administration

Memorandum

Subject: **INFORMATION:** NTSB Request for Information
LGA LLWAS Data Package for October 1996

Date: MAR 31 1997

From: Director of Airway Facilities, AAF-1

Reply to
Attn. of:

To: Manager, Recommendation and Quality Assurance Division,
AAI-200

This information is in response to a request from the National Transportation Safety Board (NTSB) concerning the problems with the Low Level Windshear Alert System (LLWAS) at LaGuardia International Airport (LGA) on October 19, 1996. The Site Performance Evaluation System (SPES) utilities data indicated a problem with the LLWAS Stations 3, 4, and 5 at LGA. Airway Facilities (AF) comments are as follow:

The Eastern Region Division, AEA-400, is improving and expanding the existing LLWAS remote station network at LGA. The improved LLWAS will consist of eight new sensor sites, replacing the present LLWAS. The timetable for completion of this project is as follows:

Land and utilities acquisitions May 1997

Equipment Installation October 1997

Commissioning November 1997

If you have any questions, please contact Bill Baumann, Management Consulting Staff, AAF-20, at [REDACTED]


Stanley Rivers

32

**National Weather Service Contract Meteorological Observatory
LaGuardia Airport
Flushing, NY 11371
Nov. 6, 1996**

The following is a report concerning the accident involving Delta Airlines flight 554. The accident occurred on the evening of 19 October 1996 at Laguardia Airport.

My name is David W. Qualls and I am a Weather Specialist employed by Weather Experts Inc.. I was on duty the evening of the accident.

At approximately 2050 UTC I was contacted by the air traffic control tower requesting current conditions due to an "incident" on the airfield. I had just taken a special observation ten minutes prior and the current hourly observation was in the process of transmitting. That observation was as follows:

**METAR KLGA 192051Z 07013KT 1SM +RA BR BKN008 BKN011 OVC019 14/14
A2950 RMK AO2 TWR VIS 2 1/2 PRESFR SLP990 R04/4000V5000FT 60137
T01440144 56005 (DQ)**

In lamens terms this observation reads that the surface winds were blowing from the ENE at 13 knots sustained. Prevailing visibility was 1 statute mile with heavy rain and mist. The sky was broken at 800 feet, broken at 1,100 feet, and overcast at 1,900 feet. Temperature and dew point were both 14 degrees Celsius. The altimeter setting was 29.50 inches.

All visually observed elements in this and all observations taken at LaGuardia were observed from the roof of the Marine Air Terminal Building.

There was approximately 6/8 of clouds observed at 800 feet, 1/8 at 1,100 feet, and 1/8 at 1,900 feet. Cloud heights were determined by ASOS ceilometer and estimation.

Visibility was determined by local visibility markers and ASOS visibility sensors. Discernible markers were the Rikers Island Bridge and lights which spans 5/8 to 1 statute mile from the Northwest to North. The air traffic control tower 5/8 of a statute mile to the East. The Con. Edison stacks 1 1/2 statute miles to the Northwest. Approach lights and lighted wind sock approximately 1 statute mile Northeast.

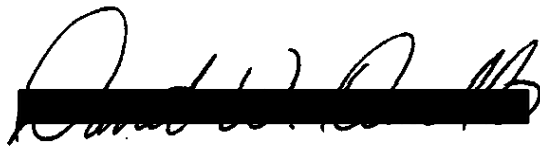
Wind speed and direction was determined from the ASOS sensors on the airfield.

Altimeter was determined from the ASOS pressure sensors.

The runway visual range was determined from the transmissometer system located on runway 04.

Light to moderate rain had been falling most of the day restricting visibility to around 2 1/2 statute miles. Surface winds were strong from the east to east southeast gusting regularly in excess of 30 knots. In the 2-3 hours leading up to the accident, winds were gusting as high as 40 knots. Shortly before the accident the rain became particularly intense and dropped visibility to 3/4 statute miles and runway visual range to as low as 4000 feet. Surface winds became lighter, sustained at 12-14 knots with no gusts. Shortly after the accident, visibility began to increase as the precipitation intensity began to decrease.

All observational procedures were performed in accordance with National Weather Service Handbook #7.

A handwritten signature in dark ink, appearing to read "David W. Qualls", is written over a solid black rectangular redaction bar.

David W. Qualls
Weather Specialist



**Department of Commerce
NOAA/NWS/ASOS**

**8455 Colesville Road
Suite 705
Silver Spring, MD 20911
Phone: (301) 427-2175
FAX: (301) 427-2183**

Date: February 3, 1997

TO: Greg Salottolo
Name

FAX No.

Phone No.

FROM: Rick Parry

Name

Phone No. (301) 427-

Number of pages, including cover sheet:

1

Remarks: Attached is the "as installed" layout of the ASOS system for LGA. Note that the primary and the back-up sensors are installed together at the site listed as "Planned ASOS Combined Sensor Group Location and Back-up Sensor Group." The meteorological discontinuity sensors are installed at the "Planned ASOS Touchdown Sensor Group Location."

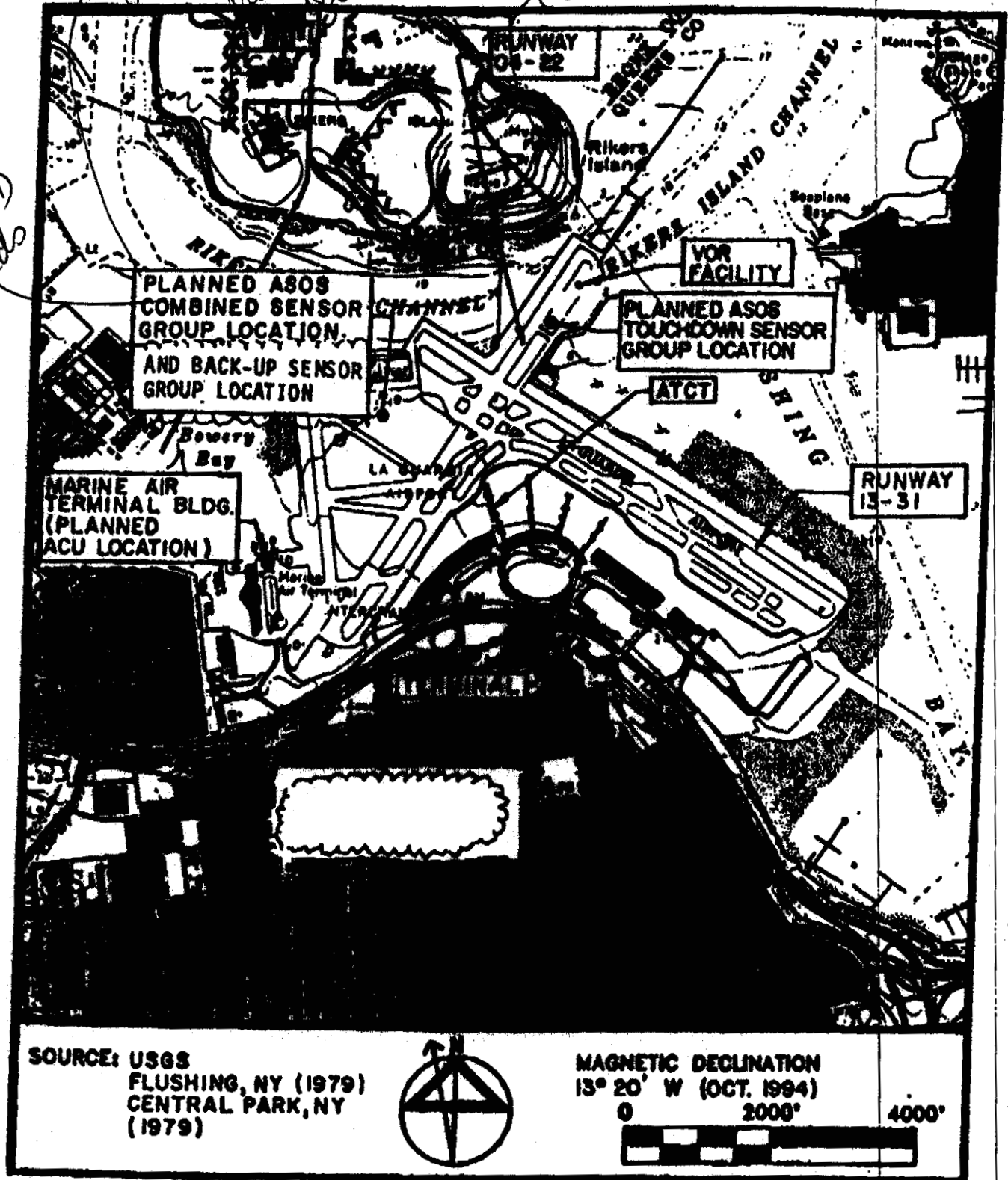
If you have any questions, please call me at

35

VIS 1 & 3 (C16)
Remain Pickup

VIS 2 (C162)

T/TD
Winds



SOURCE: USGS
FLUSHING, NY (1979)
CENTRAL PARK, NY
(1979)

MAGNETIC DECLINATION
13° 20' W (OCT. 1994)
0 2000' 4000'

SITE LOCATION PLAN
1:24,000 SCALE



U.S. Department
of Transportation
Federal Aviation
Administration

Memorandum

Subject: **INFORMATION: NTSB Request 96-124**

Date: **NOV 22 1996**

From: **Manager, Airways Facilities Division, AEA-400**

Reply to
Attn. of: **Marshall:**

To: **Manager, Recommendation and Quality Assurance Division,
AAI-200
ATTN: Theresa Payne**

We have reviewed your request for information regarding the RVR systems at LaGuardia Airport. One transmissiometer serves as both the runway (R/W) 13 and R/W 22 touchdown RVR. The transmissiometer was sited to serve R/W 22. When it became desirable to have RVR for R/W 13 touchdown, it was determined that the transmissiometer, as sited, could also serve R/W 13. Readings would be valid if the R/W 13 edge lights were set equal to, or higher than, R/W 22. To accomplish this the comparator circuit, shown on the attachment, was devised. Since this transmissiometer is correctly sited for both touchdowns, the one recording is acceptable for both runways.

The transmissiometer at the approach end of R/W 31 was installed to provide departure minimums for that runway. The equipment was designated as R/W 13 rollout to simplify paperwork since there was no R/W 31 identifier when the RVR was installed. R/W 13 is a Category I and has no "rollout" RVR.

If you have any further questions, please contact Bob Marshall, AEA-472, at [REDACTED]

Thomas G. Gault
Thomas G. Gault

Attachment

OPTIONAL FORM 90 (7-90)

FAX TRANSMITTAL

of pages = **3**

To: <i>Ireg Salattolo</i>	From: <i>Theresa Payne</i>
Dept./Agency: NTSB	Phone # [REDACTED]
Fax # [REDACTED]	Fax # [REDACTED]

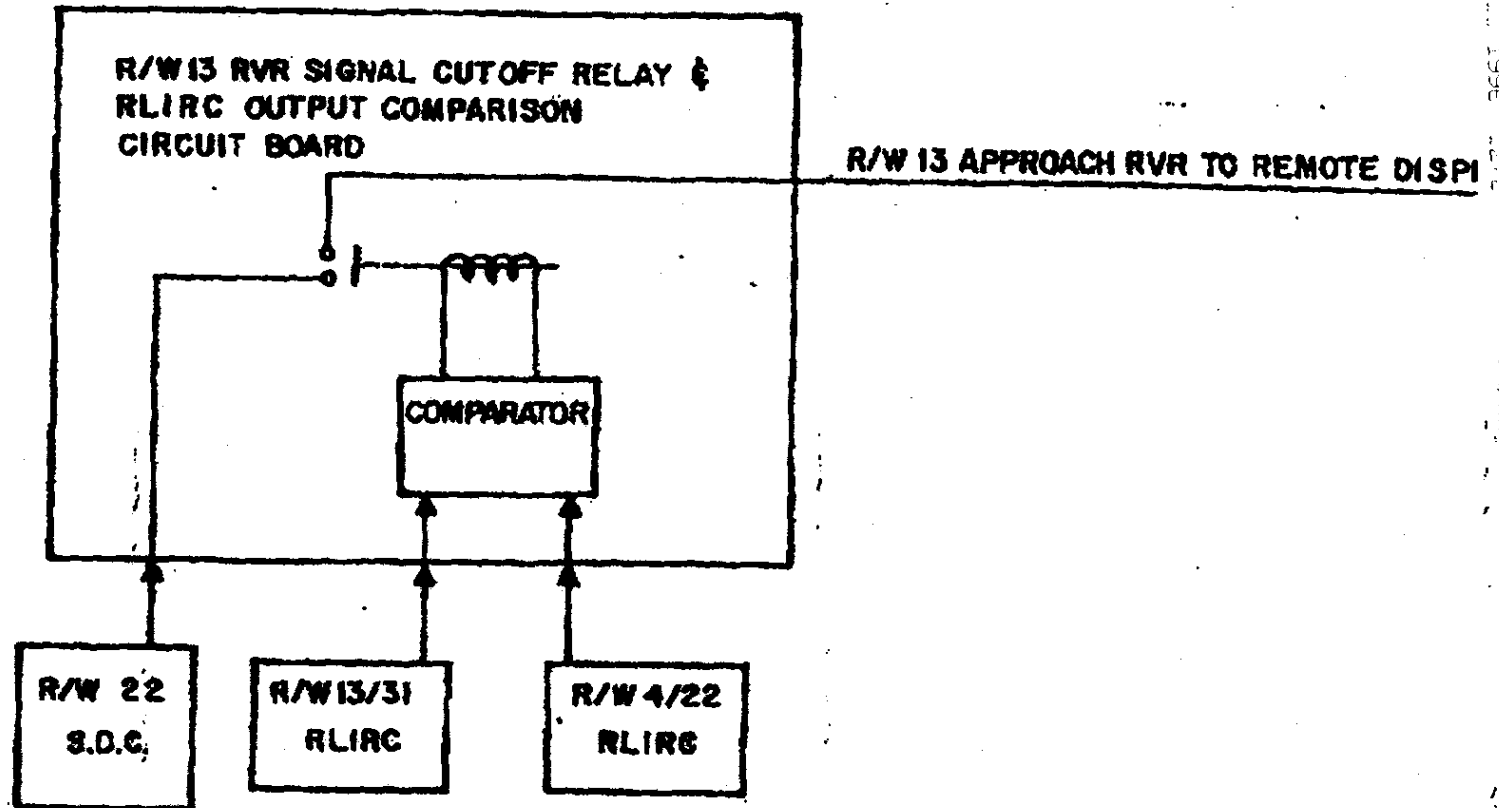
NSN 7546-01-317-7500

5010-101

GENERAL SERVICES ADMINISTRATION

37

LGA RVR



RVR 13/22 RUNWAY LIGHT SETTING MODIFICATION (SEE NOTE 1)

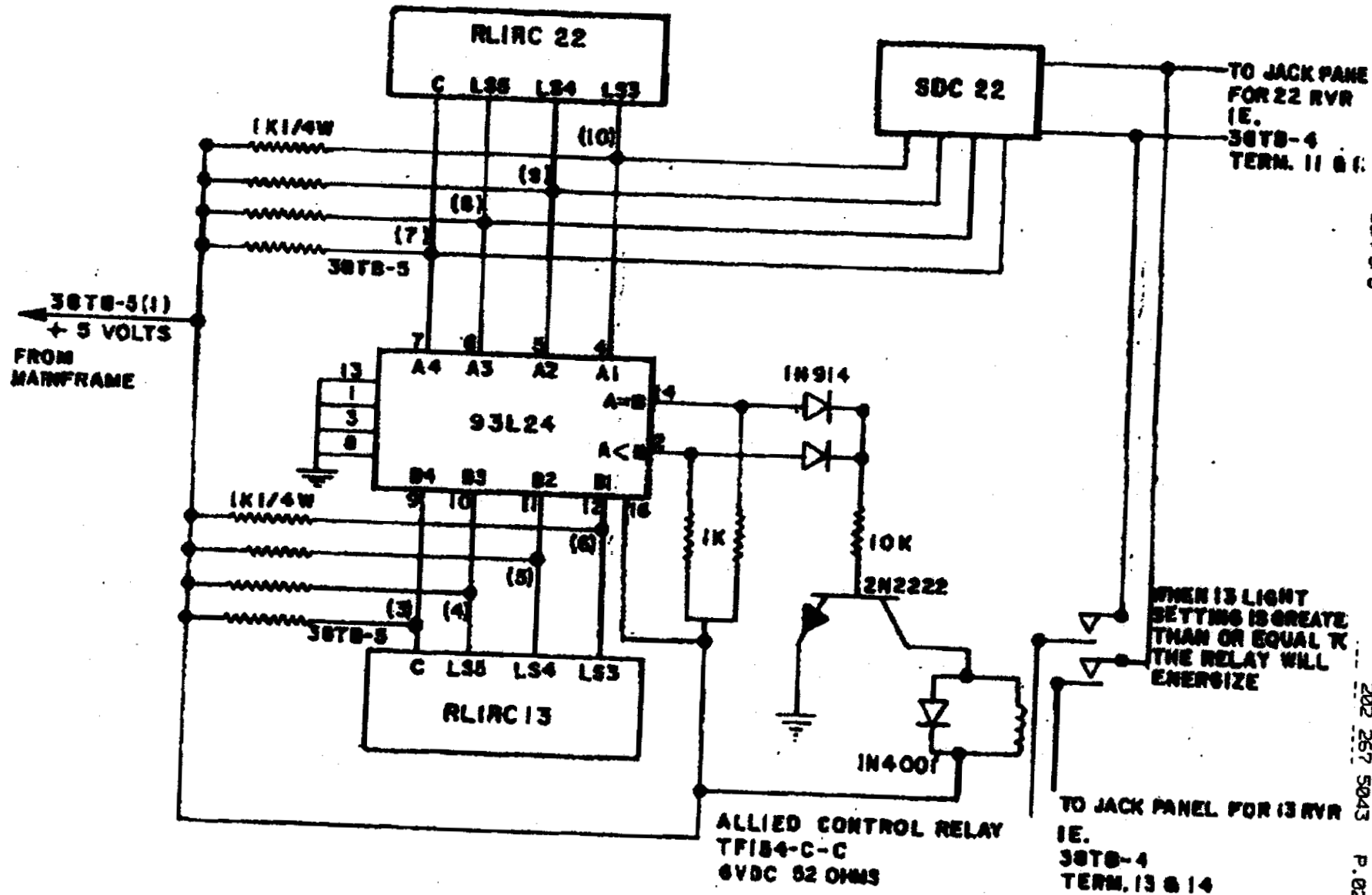
NOTE-1:

IF R/W 13 EDGE MARKER LIGHTS ARE BRIGHTER THAN OR AS BRIGHT AS THOSE OF R/W 22, THEN THE R/W 22 APPROACH RVR VALUE IS ALLOWED TO BE DISPLAYED AS THE R/W 13 RVR ON ALL REMOTE DISPLAYS.

38

100-1-103

RVR 13/22 RUNWAY LIGHT SETTING MODIFICATION



DEC-11-1996
12:06

12:06

FRP/PAI
202 267 5043

202 267 5043

202 267 5043 P.02/03

39

Salottolo Greg

From: Theresa Payne [REDACTED]
Sent: Monday, April 21, 1997 3:57 PM
To: Salottolo Greg
Subject: Re[2]: Response to 97-032 LGA LLWAS

----- Forwarded with Changes -----

From: William Baumann at aaf20
Date: 4/21/97 2:33PM
To: Theresa Payne at AAI
***cc:** Donald Bristol at AEA470
***cc:** Charles Cassella at AEA470
Subject: Re[2]: Response to 97-032 LGA LLWAS

----- Forward Header -----

Subject: Re[2]: Response to 97-032 LGA LLWAS
Author: William Baumann at aaf20
Date: 4/21/97 2:33 PM

Theresa,

Eastern Region has responded to the NTSB's question as follows:

In checking, no hardware problems were found on sensor #4.

Thanks

Bill

----- Reply Separator -----

Subject: RE: Response to 97-032 LGA LLWAS
Author: Theresa Payne at AAI
Date: 4/17/97 9:29 AM

Bill-

We can't seem to get rid of this one. The Board still needs some clarification on this request.

Thanks, Theresa

----- Forward Header -----

Subject: RE: Response to 97-032 LGA LLWAS
Author: [REDACTED]
Date: 4/17/97 7:51 AM

Theresa:

Thanks for the information. We still need clarification on the following:

1) Is there a hardware problem with sensor #4?

2) If there is, has it been fixed?

A possible hardware problem with sensor #4 was identified by the SPES.

Greg ..

>-----
>From: Theresa Payne [REDACTED]
>Sent: Wednesday, April 16, 1997 4:45 PM
>To: Salottolo Greg
>Subject: Re: Response to 97-032 LGA LLWAS

>
>----- Forwarded with Changes

>-----
>From: William Baumann at aaf20
>Date: 4/16/97 10:30AM
>To: Theresa Payne at AAI
>Subject: Re: Response to 97-032 LGA LLWAS
>----- Forwarded with Changes

>-----
>From: Charles Cassella at aea470
>Date: 4/16/97 9:16AM
>To: William Baumann at AAF20
>*cc: Selim Haber
>*cc: Peter Scotti
>*cc: Donald Bristol
>Subject: Re: Response to 97-032 LGA LLWAS

>-----
>
> Greg-
>
> Attached is a response to your followup questions regarding the LGA
> LLWAS. Let me know if you need anything else.
>
> Theresa Payne

>
>----- Forward Header

>-----
>Subject: Re: Response to 97-032 LGA LLWAS
>Author: William Baumann at aaf20
>Date: 4/16/97 10:30 AM

>
>
> Theresa,
>
>
> I apologize for the delay in responding to you on the NTSB request
> relating to 97-032. The information you requested is in the following
> message. Please let me know if this answers the NTSB request.
>
> Thanks

> Bill

>

>

> _____ Forward Header

>

>Subject: Re: Response to 97-032 LGA LLWAS

>Author: Charles Cassella at aea470

>Date: 4/16/97 9:16 AM

>

>

> Bill,

> I prepared this last week but got sidetracked before I could
> send it. Don is preparing the memo.

> Charlie

>

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> The response provided below is an interim response. The
> official response will come under the division manager's
> signature. It may be different than what you see below.

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> "What has been done to correct the problems?"

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> Additional background and clarification is provided.

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> approved criteria, at the time the system was established, it
> is apparent that the development of SPES has found some
> possible problems. As part of our continuing effort to provide
> the best information available on wind-shear, a project was
> developed to expand and improve the system. The schedule for
> that program was provided.

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> I will attempt to answer them below.

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> Concerns were previously raised over the possibility of some
> stations not being ideally sited. The first concerns resulted
> in a memo by AOS-200, dated March 14, 1994. A second request
> for clarification was answered by AOS-200 on November 8, 1996.
> Both responses are consistent in recommending that the LLWAS
> remain in operation until new locations can be determined and
> installed. The rationale is that although there may be some
> false alerts and there may be some wind-shear not detected,
> wind-shear detection benefits are still being derived. We plan
> to continue to operate the LGA LLWAS in its current
> configuration until the system is modified this Fall.

>

>

>

>

> _____ Reply Separator

>

>Subject: Response to 97-032 LGA LLWAS

>Author: William Baumann at aaf20

>Date: 4/9/97 9:51 AM

>

>

> Charlie,
>
> This is the information I forwarded to Don, thanks in advance for your
> assistance.

> Bill

> _____ Forward Header

> _____
> >Subject: Response to 97-032 LGA LLWAS
> >Author: William Baumann at aaf20
> >Date: 4/4/97 7:41 AM

> Donald,

> Your response to this message is needed today! Please forward your
> information to me via. cc:mail, and follow it up with a Memo. If you
> have any questions, please call me at [REDACTED] thank you.

> Your original memo. did not answer the questions being ask by the
> NTSB.

> Bill Baumann

> _____ Forward Header

> _____
> >Subject: Response to 97-032 LGA LLWAS
> >Author: Theresa Payne at AAI
> >Date: 4/3/97 12:21 PM

> Bill-

> I received this message in response to the memo we sent over regarding
> the NTSB's request for information concerning the LLWAS at LaGuardia.
> It seems that the NTSB still has come concerns. How do you want to
> handle this?

> Thanks, Theresa

> _____ Forward Header

> _____
> >Subject: Response to 97-032 LGA LLWAS
> >Author: Salottolo Greg [REDACTED]
> >Date: 4/3/97 12:19 PM

> Theresa:

> >Received FAX response. Thank you.

> >We are still concerned about the current functionality of the LLWAS. The
> >SPES utilities indicated a possible hardware problem with sensor #4. Has
> >this problem as well as the problem with sensor #3 and #5 been

~~Page 4~~

43

>addressed? How was it addressed?

>

>Thanks ..

>

>Greg ..

>

~~Page 44~~

44

Salottolo Greg

From: Bob Henley
To: salottg
Subject: NTSB Request Your message 11/4
Date: Thursday, November 14, 1996 8:08AM
Priority: High

----- Forwarded with Changes

From: Christine Soucy at ath1
Date: 11/13/96 8:48AM
To: Bob Henley at AAI
Receipt Requested
Subject: NTSB Request Your message 11/4
----- Forwarded with Changes

From: Cal Fischer at AAF1
Date: 11/8/96 3:50PM
To: Christine Soucy at ATH1
Subject: NTSB Request Your message 11/4

NADIN
*National Airspace
Data Interchange
Network*

Greg, give me a call at [REDACTED] after you receive the attached.

BH

----- Forward Header

Subject: NTSB Request Your message 11/4
Author: Christine Soucy at ath1
Date: 11/13/96 8:48 AM

Bob,
The message below explains why air traffic facilities did not receive or have any record of SIGMET Uniform 4. If you have any questions, give me a call...I may be able to answer some of the less complex types!

Chris

----- Forward Header

Subject: NTSB Request Your message 11/4
Author: Cal Fischer at AAF1
Date: 11/8/96 3:50 PM

HERE IS A CHRONOLOGICAL ORDER OF EVENTS THAT OCCURRED CAUSING ALL OF THE AFSS'S TO MISS THE BOS SIGMET UNIFORM 4 WEATHER PRODUCT. (NOTE, SLC HAD THE LOAD SHARE RESPONSIBILITY FOR ALL SIGMET WEATHER PRODUCTS FOR THE MONTH OF OCT).

AT 192030Z, SEVERE STORMS CENTER (NWS) SENT BOS SIGMET UNIFORM 4 TO

~~SECRET~~

45

THE ATL WMSR. (THIS WAS 2 MINUTES AFTER THE REPORTED AIRCRAFT ACCIDENT OF 2028Z)

AT 192036Z, THE ATL WMSR RECEIVED THE BOS SIGMET UNIFORM 4 FROM THE NATIONAL WEATHER SERVICE (NWS).

AT 192037Z, SLC WMSR RCVD THE BOS SIGMET UNIFORM 4 FROM THE ATL WMSR AND WAS SENT TO THE OUTPUT PARTITION OF THE AWP SLC FOR DELIVERY TO ALL THE AFSS'S AT THE SAME TIME, 2037Z.

AT 2011Z THE NADIN 1 PORT ASSOCIATED WITH THE SLC AWP WENT INTO A POLE FAILURE/SELF MODE. WHAT THIS MEANS IS THAT AWP FAILED TO RESPOND TO OUR SELECTION REQUEST FOR DATA BEING SENT FROM SLC WMSR. THE PROTOCOL AS SET UP WILL TRY THE SELECTION REQUEST 3 TIMES, IF NO RESPONSE BY THE THIRD RETRY THE WEATHER MSG IS DISCARDED BY THE CONCENTRATOR. AT 2052Z THE PORT WAS RECYCLED WHICH CLEARED THE SELF FAILURE CONDITION. ALL WEATHER PRODUCTS TRANSMITTED FROM THE SLC WMSR TO THE SLC AWP WERE DISCARDED FROM THE TIME OF POLE FAILURE/SELF MODE UNTIL THE CONDITION WAS CLEARED BY RECYCLING THE PORT.

TROUBLESHOOTING TO FURTHER UNDERSTAND THIS EVENT IS ONGOING. HOWEVER, WITH THE INFORMATION KNOWN AT THIS TIME WE WILL INITIATE THE FOLLOWING ACTION WHICH WILL PREVENT THE LOSS OF WEATHER PRODUCTS FOR ALL WMSR CIRCUITS WHEN THE ABOVE CONDITION OCCURS:

DEVELOP AN NCP TO HAVE ALL WMSR TYPE DATA GO TO NADIN 1 SWITCHING CENTERS AT "BOTH" SLC AND ATL FOR PROCESSING WHICH IN TURN WILL QUEUE UP TO THE PORT ASSOCIATED WITH WMSR WHEN THE ABOVE CONDITION OCCURS.

— *Nadine Change Proposal* — [NCP]

Author: Teresa E. Hudson at AOS1
Date: 12/6/96 4:52 PM
Priority: Normal
Receipt Requested
TO: William Baumann at AAF20
Subject: NTSB Request

----- Message Contents -----

Below are the answers to the questions the NTSB asked:

1. When/how does AT receive the message? Is it received simultaneously with the FSS.

NADIN sends the message to all users that are required to receive it. The message goes to the HOST in all centers as well as the FSS. We do not know the method that Air Traffic uses to read the message.

2. It was reported that the NADIN 1 port associated with the SLC ANP went into pole failure/self mode. Is this due to the design of the equipment, please explain.

This is designed into the equipment. Many of the service A Ports including ANP use ANST 3.20 Multipoint Protocol. This protocol employs Polling, selection, and verification. NADIN polls a station for message input, selects a station for output, and verifies the message delivery for each station selected for delivery. Each of these activities are repeated three times before a failure event is generated.

3. AFA reported that an NCP should be developed to have all WMSCR data go to NADIN switching centers at both SLC and ATL for processing which in turn will QUEUE up to the port associated with WMSCR when this problem occurs. How does the system work now? Would this proposed NCP keep this type of outage from reoccurring?

The NADIN receives WMSCR data and disseminates to the users. Since this data is weather, the determination was made that the data should not be saved (the data from NOTAMS, FLIGHT plans etc. are examples of saved data) but should be considered perishable. If the message is not received, it is discarded.

The proposed NCP would require the weather data to become saved information which would mean that when the port became available the message would be sent, regardless of the time the original message was sent. Many "saved" weather messages would be unusable, however this might be feasible for some. The NCP will be evaluated thoroughly.

Salottolo Greg

From: Salottolo Greg
To: Jim.Anderson
Subject: RE: DL554 METEOROLOGY GROUP - QUESTIONS
Date: Monday, November 25, 1996 2:33PM

Jim:

Thanks for the info.

I have a comment regarding Center Weather Advisories [CWAs] and AIRMETs. CWAs are defined by the National Weather Service [Weather Service Operations Manual D-25] as "an aviation weather warning for conditions meeting or approaching national in-flight advisory (AIRMET, SIGMET, or Convective SIGMET) criteria. The CWA is primarily for use by air crews to anticipate and avoid adverse weather conditions in the en route and terminal environments."

AIRMETs for IFR, turbulence, and icing are routinely issued every 6 hours.

Greg ..

From: Jim.Anderson
To: salottg; hancocr
Cc: Ralph.Hicks; Arlan.Ellmaker; John.Lauber; Steve.Predmore
Subject: DL554 METEOROLOGY GROUP - QUESTIONS
Date: Monday, November 25, 1996 1:24PM

----- Forwarded with Changes

From: Arlan Ellmaker at OCC-FCTRL
Date: 11/25/96 3:28PM
To: Jim Anderson at FLDSVC-GO
Subject: PLEASE PROVIDE COMMENTS TO ARLAN ELLMAKER
----- Forwarded

From: Susan Smith at OCC-ADMIN
Date: 11/19/96 3:47PM
To: Arlan Ellmaker at OCC-FCTRL
*To: Frank Shea
*To: William E Hudson
*To: Daniel O'Brien
*To: Ray Redlich
*To: Truman Tinsley at FCTRL-ADMIN
*To: Kirk Tuttle at FCTRL-ADMIN
*To: Hank Echols
*To: Jim Anderson at FLDSVC-GO
Subject: PLEASE PROVIDE COMMENTS TO ARLAN ELLMAKER

Greg...Following are the answers to the questions you forwarded to me.
Please let me know if further information is needed.

----- Forward Header

Subject: PLEASE PROVIDE COMMENTS TO ARLAN ELLMAKER
Author: Arlan Ellmaker at OCC-FCTRL
Date: 11/25/96 3:28 PM