PIREP

Introduction to PIREP Processing at United Airlines

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A STAR ALLIANCE MEMBER

UNITED

Background

- 1997:
- Legacy UNIMATIC storage for PIREPS entered by dispatcher or downlink from ACARS (POSWX).
- EDR data reported by UAL aircraft to NCAR for R & D.
- *Could not feed to NWS.*
- Severe Turbulence event: UAL826 RJAA-PHNL Dec. 1997
  - 1 Passenger Killed, 74 injuries
  - Cabin Damage
- NWS PIREP Collection process existed but only worked between FSS/CWSU-NWS and ARINC-NWS

Research

- U. S. & Canada - largest users of PIREP system.
- Outside U. S., (limited) collection is over oceanic areas *(mostly only temperature & wind)*.
- EDR data not available for tactical “real-time” use
- Some airlines considered their PIREPS “proprietary”
- Found that existing legacy IATA Type “B” and AFTN messaging capable of PIREP transmission

SOLUTION

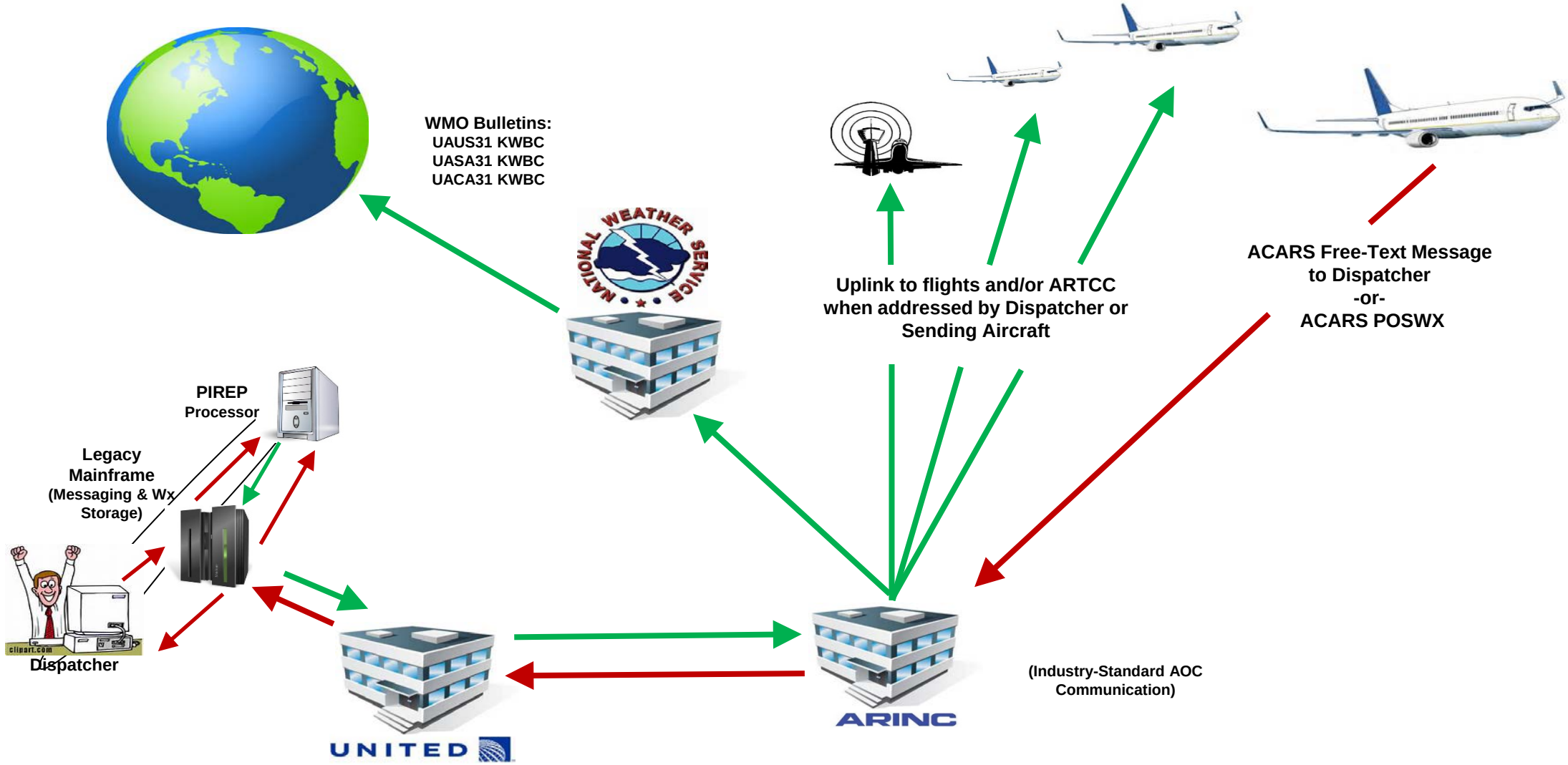
- GOAL: Get PIREPS into NWS system
- 1997/1998: NOAA creates 3 WMO bulletins for United ***(UAUS31 KWBC, UASA31 KWBC, UACA31 KWBC)***
- ARINC creates address for each ***(DOMOOXA, SAMOOXA, CAMOOXA to point to these collectives)***
- Built processor to perform message handling.
- 1998-2000: experimented with automatic flight advisory
- 2000: Added processing for ACARS Position/Weather (POSWX) messages

Current Initiative

- Strengthen use of system within the company
  - May 2016
    - ACARS POSWX 1,737 Messages
    - Dispatcher 1,440 Messages
    - TOTAL 3,177 Messages

- Rebuild processor to improve reliability & capability
  - Automatic Flight Advisory

PIREP Message Flow Process (United)



Message Examples (Dispatcher-Submitted)

(After Free-Text or Voice Communication from Aircraft)

```
CHITB
.CHIVOUA 011224/333282 80511
UAL         1251-01 ORD
OVER        FAM 020020
TIME        1220
FL          340
TEMP
WIND
TURB        LGT
ICE
RMK         OCNL LT CHOP
ADV
```

Dispatcher's Formatted Input Screen

```
[[QU DOMOOXA
.AEP
FI UAL1251/OV 3759N09004W 1220 F340
/TA /WV /TB LGT/IC
/RM A320 OV FAM020020 OCNL LT CHOP
```

Message to NWS

Note! Position is converted to latitude/longitude coordinate

```
01/1224Z   UAL1251 FAM020020 1220 F340/TA /WV /TB LGT RMK: OCNL LT CHOP A320 ORD-IAH FIR:KZKC GRID:MCI
```

(Locally-stored for in-company use)

```
068
UAUS31 KWBC 011227
ARP UAL963 57N 040W 1217 F340 TB CONT LGT CHOP RM B764 OV 57N040W STARTED 60E OF
40W=
ARP UAL1251 3759N 09004W 1220 F340 TB LGT RM A320 OV FAM020020 OCNL LT CHOP=
```

NWS Published Bulletin

Message Examples (Flight Deck-Submitted)

(ACARS POSWX Message)

```
BDRACXA ANPNCXA CHITB
.HDQCOUA 011302/
QU DPCUNUA
.DDLXCXA 011302
AGM
FI UA981/AN N73406
DT DDL JAN 011302 M44A
- /PW IAHTPA 01
/OV REDFN250150     1301 F350/FB 0183
/TA ---/WV 270016/SK IN CLOUDS
/TB LIGHT   /IC NONE
```

"Raw" downlink from Formatted ACARS Position/Weather Screen

```
[[QU DOMOOXA
.AEP
FI UAL981/OV 2759N09121W 1301 F350
/TA /WV 270016/SK IN CLOUDS
/TB LGT/IC NONE
/RM B739 OV REDFN250150
```

Message to NWS

Note! Position is converted to latitude/longitude coordinate

```
01/1302Z   UAL981 REDFN250150 1301 F350/TA /WV 270016/SK IN CLOUDS/TB LGT/IC NONE /RM  B739 IAH-TPA FIR:KZHU GRID:
```

(Locally-stored for in-company use)

```
213
UAUS31 KWBC 011306
ARP UAL981 2759N 09121W 1301 F350 270/016KT TB LGT SK IN CLOUDS IC NONE RM B739
OV REDFN250150=
```

NWS Published Bulletin

Message Examples (Flight Deck-Submitted)

(ACARS POSWX Message & Message To Other Company Aircraft)

(In Addition to Normal Processing)

```
BDRACXA ANPNCXA CHITB
.HDQCOUA 031943/
QU DPCUNUA
.DDLXCXA 031943
AGM
FI UA888/AN N178UA
DT DDL ACV 031943 M33A
- /PW SFOPEK 03
/OV LINUZ           1937 F320/FB 2534
/TA -42/WV 156032/SK CLEAR
/TB NONE    /IC NONE
/RM CC 893
```

"Raw" downlink from Formatted ACARS Position/Weather Screen

```
PIREP FROM UAL888
UAL888/OV LINUZ 1937 F320
/TA MS42/WV 156032/SK CLEAR
/TB SMTH/IC NONE
/RM B744 SFO-PEK
YOUR DISPATCHER IS ADVISED.
RGDS/PIREP PROCESSOR
```

Uplink message to UAL893

```
PIREP SUBMITTED:
SENT TO NWS: YES
IN UNIMATIC: YES
IN DATAFILE: YES
# OF CC SENT:  1 OF 1
FAILURES:  NONE
```

Uplink "Receipt" Message To Sending Aircraft

```
************************************
       HEY  DISPATCHER
************************************
UAL888 SENT THE FOLLOWING PIREP TO YOUR 893-3 SFO-ICN

UAL888/OV LINUZ 1937 F320
/TA MS42/WV 156032/SK CLEAR
/TB SMTH/IC NONE
/RM B744 SFO-PEK

THE MESSAGE WAS TRANSMITTED SUCCESSFULLY.
```

USM Message To Receiving Flight's Dispatcher

UNITED

Future?

- Challenges
  - “Proprietary” versus “Safety of Flight”
  - Wide range of directional pursuits

- SWIM could be ideal place for automated flight alerting
  - Knows flight routes/flight paths
  - Could take all automated and human-submitted and provide overt alerting to “logged-on” aircraft and AOCs according to user-defined characteristics.

- Develop & implement Volcanic Ash & Mountain Wave TEIs