

Liquid Water Equivalent Operational Demonstration



Overview

- LWE systems
 - How they work
 - What improvements they provide
- FAA-sponsored Operational Demonstration
 - Test results

The Challenge

During winter weather conditions the Captain needs an accurate, reliable and straightforward way to answer one question:



Am I safe to take off?

The Problem

- Current methods to measure snowfall intensity are
 - Imprecise (visibility-based)
 - *Operational restrictions*
 - Complex for the pilots
 - *Distractions at critical times*
 - *Safety risk*

Simplify

- Our fluids are getting better
- Our operations are safer
- Our documentation and processes are getting more complex
- Complexity creates safety, operational and compliance risk

How Do We Simplify?

- Provide the Captain with a simpler way to know the effectiveness of the anti-ice fluid, that is also more precise.

Liquid Water
Equivalent

LWE



Anti-Ice Fluids

- Water absorption capabilities are precisely known
- Measure accumulated water since application of anti-ice fluid



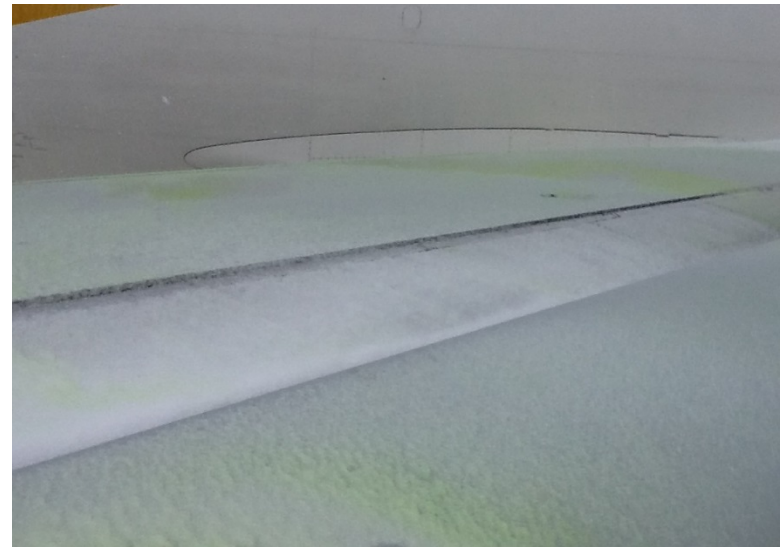
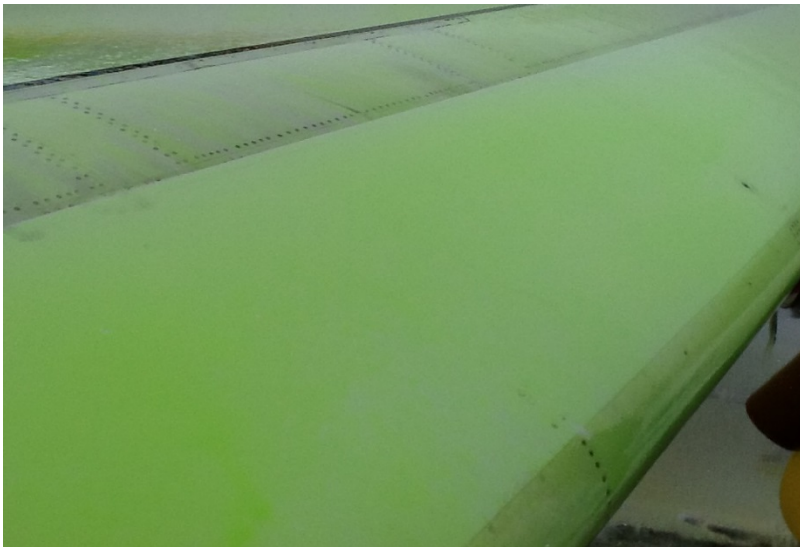
Am I Safe to Depart?

Compare the accumulated water to the absorption capability of the fluid

Is the fluid saturated?

No – take off

Yes – don't take off

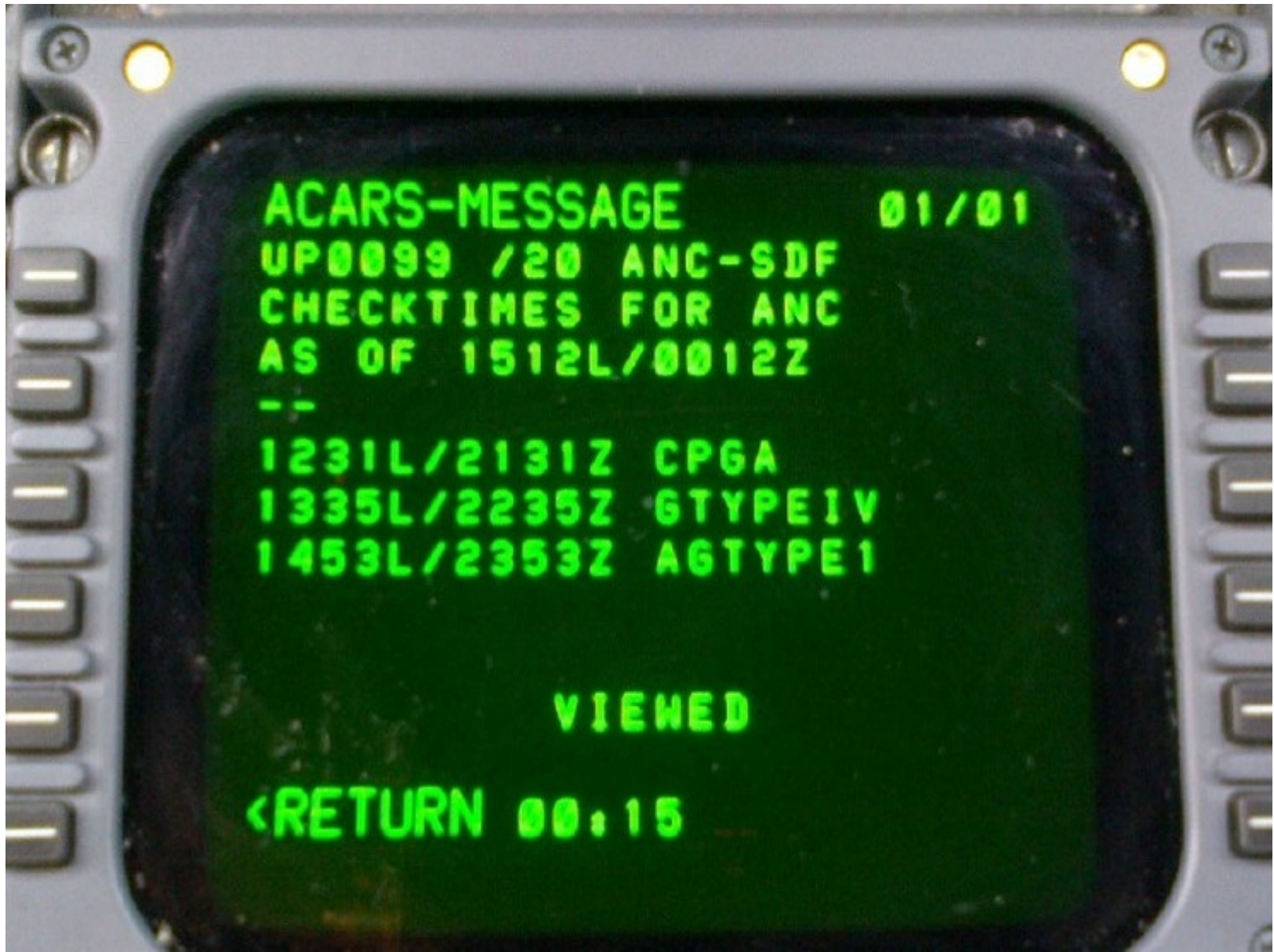


Two Approaches

- Modified Holdover Time
 - SureWx
- CheckTime
 - Vaisala



ACARS Message to Crew



ACARS-MESSAGE 01/01

UP0099 /20 ANC-SDF

CHECKTIMES FOR ANC

AS OF 1512L/0012Z

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1231L/2131Z CPGA

1335L/2235Z GTYPE1V

1453L/2353Z AGTYPE1

VIEWED

<RETURN 00:15

Anti-iced at
1430L/2330Z

Anti-Ice Time
1430

CheckTime
1231

Is
CheckTime
earlier than
Anti-ice
time?

Takeoff is
authorized

WARNING:
DO NOT
TAKEOFF

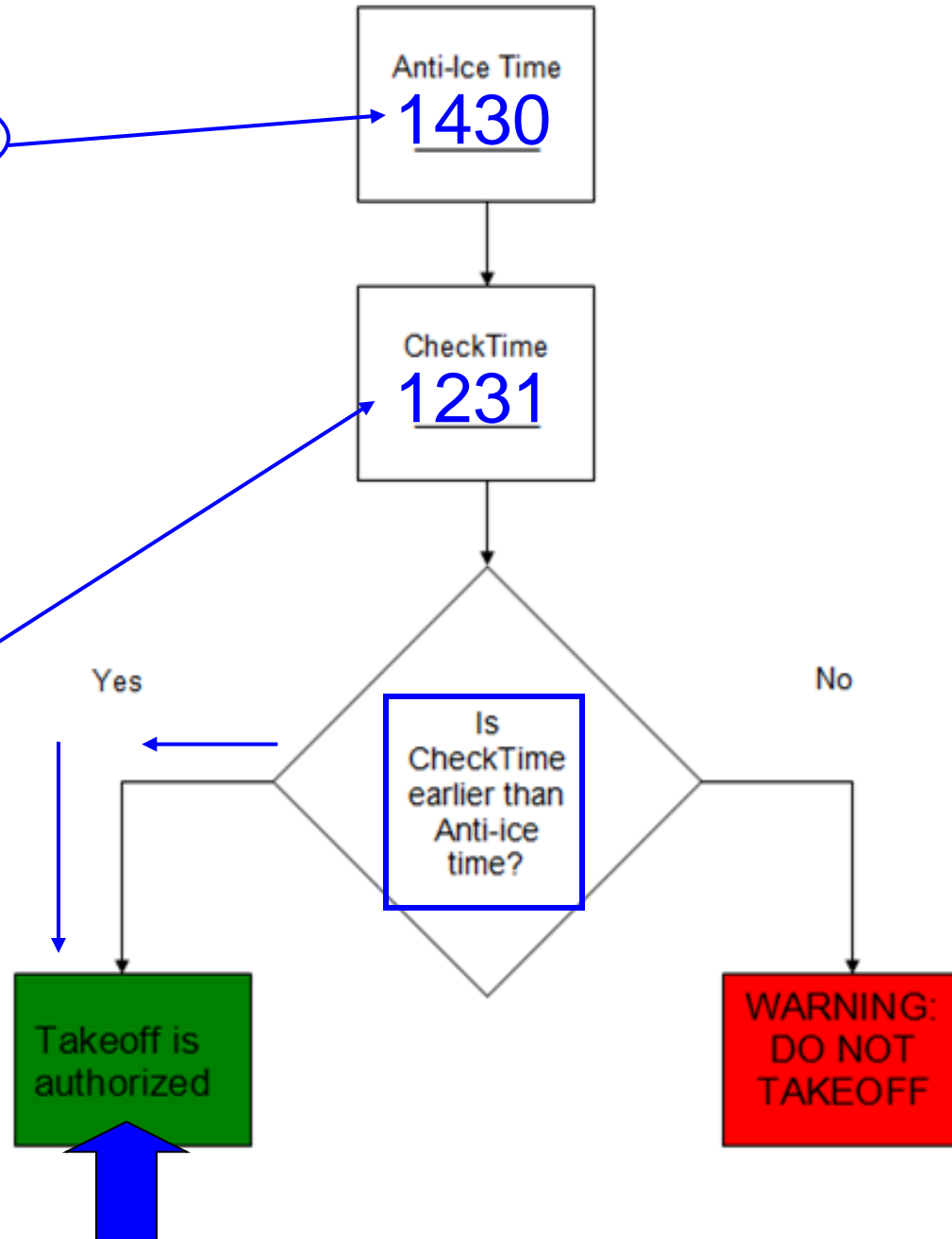
ACARS-MESSAGE
UP099 /20 ANC-SDF
CHECKTIMES FOR ANC
AS OF 1512L/0012Z

--
1231L/2131Z CPGA
1335L/2235Z GTYPEIV
1453L/2353Z AGTYPE1

<REJ ACK>
<RET

Yes

No



Improvements Based on LWE

- Reduction of the need for Type IV in very light or light snow
 - Environmental benefits
 - Cost savings
- Extended fluid effective time
- Elimination of PTOCC
 - “Heavy Snow” no longer matters

Simplification of pilot procedures

Holdover Table Procedures

--Ascertain:

Time of day (day/night)

OAT

Visibility (tower/ground)

-Accomplish the Snowfall Intensity Flow Chart to determine applicable snowfall intensity

Is the snowfall intensity Heavy?

-If yes, do not depart unless PTOCC inspection is available

-If no, refer to the Holdover Table for the type of fluid used

-Determine holdover time based on very light, light or moderate snowfall intensity

-Monitor snowfall intensity and METAR changes during taxi. If conditions are changing, adjust holdover time as needed.

-At end of runway, make a final review of your holdover time.

-If holdover time has been exceeded, return to ramp for additional de-ice/anti-ice treatment.

LWE Procedures

--Request information via ACARS.

-Monitor information during taxi if conditions are changing

-Make final request within five minutes of departure.

-If time has been exceeded, return to ramp for additional de-ice treatment.

Operational Demonstration

Vaisala – Alaska, ExpressJet, UPS
SDF, ANC, MSP, DEN, ORD

Purpose – demonstrate accuracy
and reliability of system interfaces

Certification

UPS was the Lead Carrier

- Created ACARS interface
- Accomplished SMS Risk Assessment
- Created and coordinated procedures and training
- Provided training module to Alaska and ExpressJet

Coordinated approval through CMO

- Approval granted on Feb 19

CheckTime Results

System functioned as designed

- 1700 information requests
 - All responded to within seconds
 - All responses were accurate
 - No system failures
- 400 aircraft departed in winter wx conditions under CheckTime procedures

LWE Limits

- FAA imposed a 25 g limit of the ops demo
- With moderate wind, even light snow often showed excessive LWE
- When needed most, the CheckTime system returned an ERROR message
- FAA has raised this limit to 50 g

Other Forms of Precipitation

- Restriction only to snow is very limiting
- Looking forward to the inclusion of other forms of precip
 - Freezing drizzle / rain
 - Ice pellets

Pilot Critiques

Pilots liked the simplicity

- No snowfall intensity tables
- No holdover tables

Look-back was confusing at first

- Training made a difference
- Got used to it

Successful Demonstration

Airlines now able to request authority
to use HOTDS



Thanks in order for:

Nancy Thomsen	Vaisala
Steve Howe	
Mindy Waham	Alaska
Sheryl Clarke	ExpressJet
Chuck Enders	FAA
Craig Botko	
Bill King	

Questions?

