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00:00:00,000 --> 00:00:05,000

Every commercial airplane has an ice protection system that protects the wings,

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00:00:05,001 --> 00:00:09,001

engines, and other areas from in-flight airframe icing.

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00:00:09,002 --> 00:00:12,302

If an airplane encounters an icing cloud

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00:00:12,303 --> 00:00:15,303

a cloud containing liquid water droplets

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00:00:15,304 --> 00:00:17,304

that are at below freezing temperatures,

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00:00:17,305 --> 00:00:20,305

ice might form on its wings and other surfaces.

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00:00:20,306 --> 00:00:23,306

The effect of this ice accumulation

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00:00:23,307 --> 00:00:25,307

could range from an increase in drag

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00:00:25,308 --> 00:00:28,308

to possible handling problems that the pilot would have to overcome.

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00:00:28,309 --> 00:00:32,309

To better understand and protect against airframe icing,

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00:00:32,310 --> 00:00:37,310

NASA's Icing Research Aircraft and Icing Research Tunnel

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00:00:37,311 --> 00:00:40,311

help us investigate how ice accumulates,

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00:00:40,312 --> 00:00:43,312

the various shapes this ice accumulation can take,

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00:00:43,313 --> 00:00:47,313

and their effect on the aerodynamic performance

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00:00:47,314 --> 00:00:49,314

and handling of the aircraft.

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00:00:49,315 --> 00:00:54,315

NASA is also working on sensors that can remotely detect icing conditions aloft.

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00:00:54,316 --> 00:00:57,316

By knowing the current conditions ahead,

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00:00:57,317 --> 00:01:01,417

pilots and controllers can respond more appropriately.

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00:01:01,418 --> 00:01:07,418

NASA's wealth of in-flight icing research has been translated to operational guidance

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00:01:07,419 --> 00:01:11,419

for pilots through the development of training materials.

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00:01:11,420 --> 00:01:15,420

NASA has partnered with the FAA and other international organizations

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00:01:15,421 --> 00:01:18,421

to provide free, online courses.

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00:01:18,422 --> 00:01:23,422

Helping pilots make better operational decisions helps us all.

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00:01:23,423 --> 00:01:27,423

Research on in-flight icing and the pilot training aids

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00:01:27,424 --> 00:01:32,424

have resulted in increases to the safety of travel on today's commercial airliners.

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00:01:32,425 --> 00:01:37,425

A NASA-developed fluid also contributes to flight safety

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00:01:37,426 --> 00:01:41,426

without introducing dangerous chemicals into the environment.

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00:01:41,427 --> 00:01:46,427

Ice buildup on aircraft is eliminated with a non-toxic fluid

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00:01:46,428 --> 00:01:50,428

so environmentally safe, its ingredients have been approved

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00:01:50,429 --> 00:01:52,429

by the Food and Drug Administration for use in food!

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00:01:52,430 --> 00:01:57,430

The new fluid does a better job of grabbing onto an airplane surface

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00:01:57,431 --> 00:02:02,431

when a plane is at rest, providing a long-lasting barrier to ice build up.

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00:02:02,432 --> 00:02:06,432

But when the plane takes off, the fluid gets thinner,

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00:02:06,433 --> 00:02:08,433

and blows away, so the wings are clean

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00:02:08,434 --> 00:02:12,434

and have plenty of lift force to become airborne.

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00:02:12,435 --> 00:02:17,435

With an estimated half a billion gallons of aircraft de-icing fluid