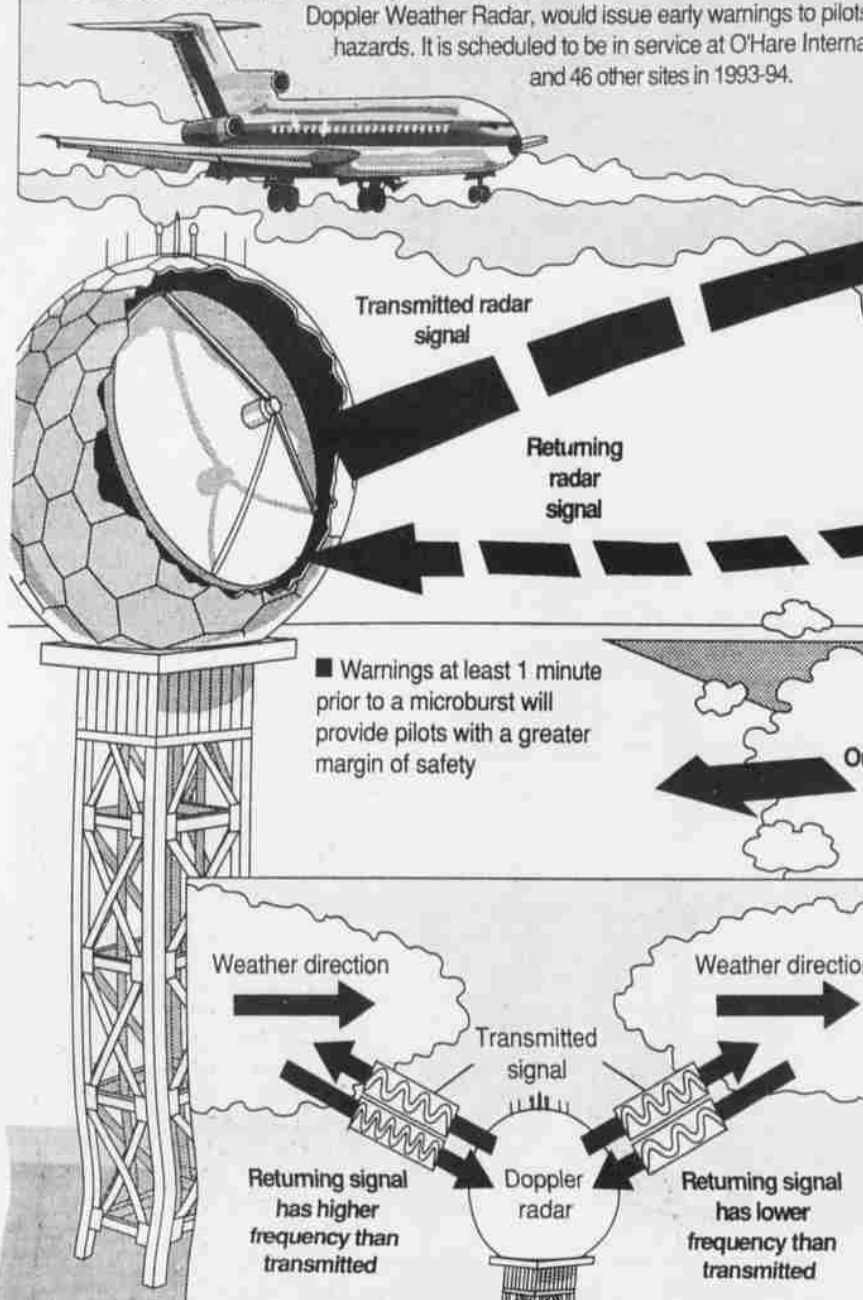


Forecasting microbursts

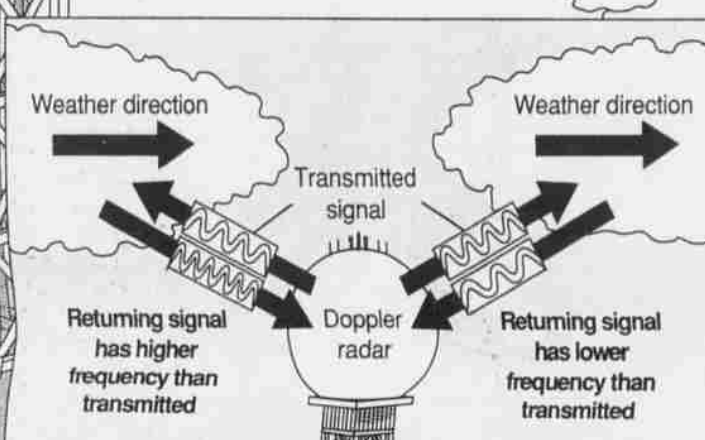
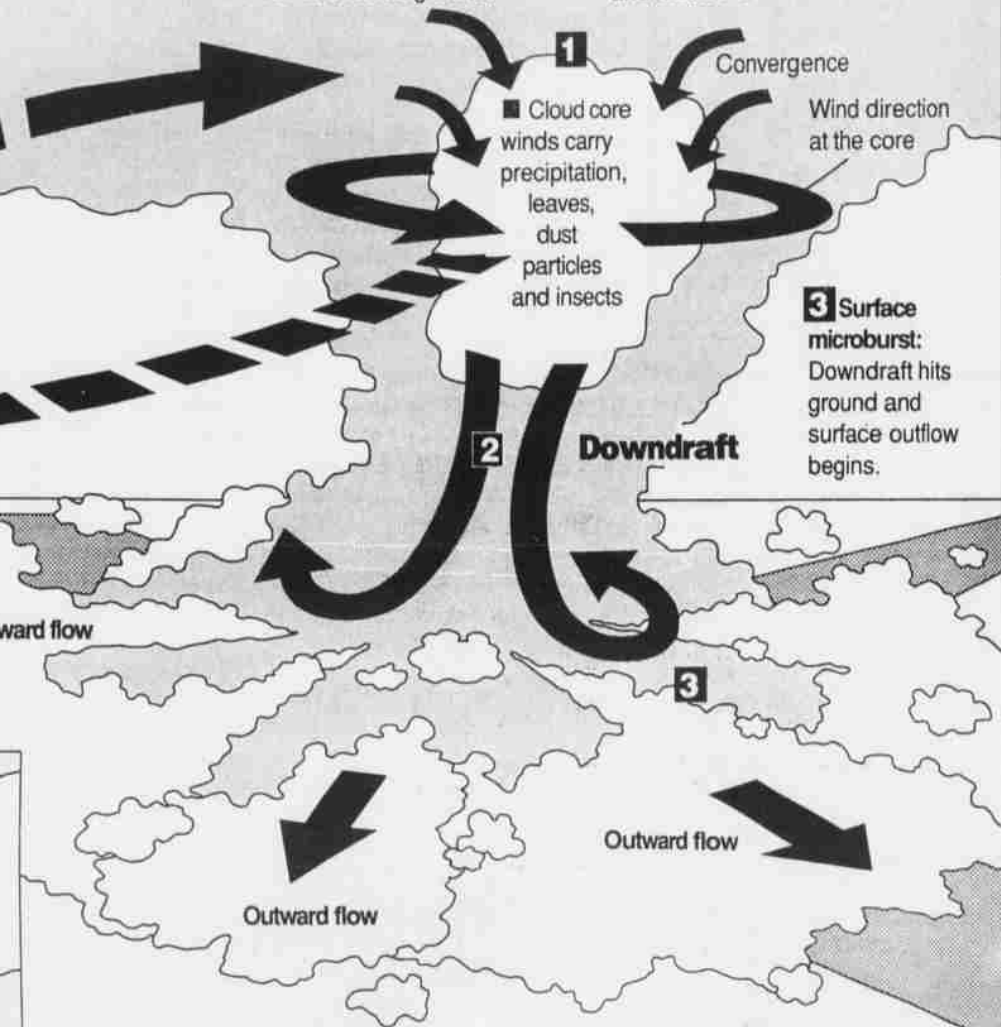
Microbursts, macrobursts, downbursts and gust fronts are all forms of windshear—extreme wind shifts that can threaten safety of air passengers. Standard airport weather radar systems can locate storms, but cannot detect windshear. Ground-based sensors measure high winds, but cannot provide advanced warnings of windshear. A new form of weather radar, called Terminal Doppler Weather Radar, would issue early warnings to pilots of such hazards. It is scheduled to be in service at O'Hare International Airport and 46 other sites in 1993-94.



Formation of a microburst: What Doppler looks for

The most dangerous kind of windshear is the microburst, which can produce winds up to 170 m.p.h. and last for up to 20 minutes.

- 1 Initial stage: The core of a cloud becomes highly reflective to radar 5 to 10 minutes before the microburst touches ground.
- 2 Descending core: Downdraft begins with convergence and rotation of winds.
- 3 Surface microburst: Downdraft hits ground and surface outflow begins.



Doppler radar determines speed and direction

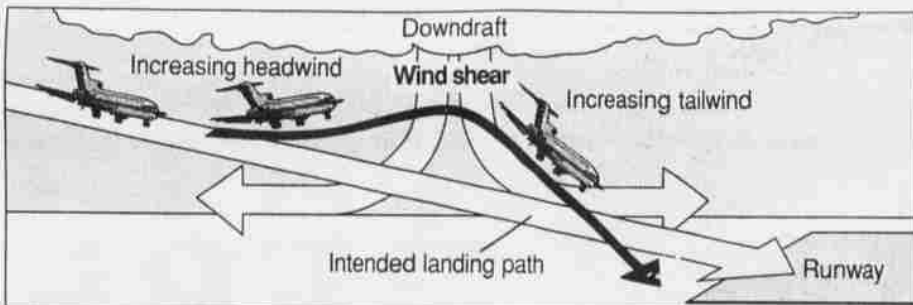
Doppler radar emits microwave radiation at a uniform frequency that is reflected back by precipitation, leaves, dust particles and insects in storms. The returning signal's frequency is measured and compared with the emitted frequency to determine the direction and speed of movement of winds within storms.



What is the Doppler effect

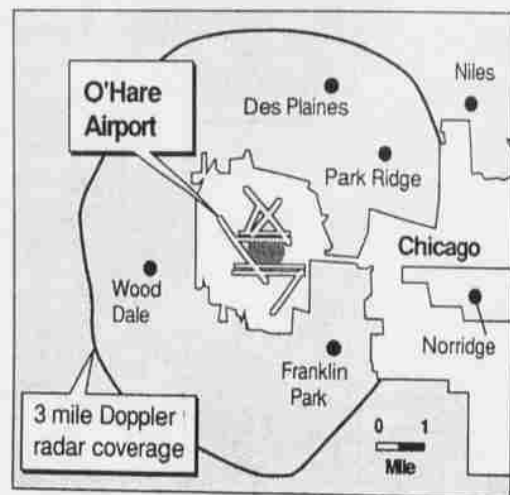
The Doppler effect is the change in wavelength or frequency that occurs when a source of sound, light or radiation is in motion. If the source is moving toward the observer, the wavelength becomes shorter and the frequency increases; if the source is moving away from the observer, the wavelength lengthens and the frequency decreases.

Aircraft hazard: A plane flying through a microburst encounters extreme changes in wind speed and direction—first headwinds, then downdrafts, and then potentially deadly tailwinds.



Doppler weather radar: How it will work

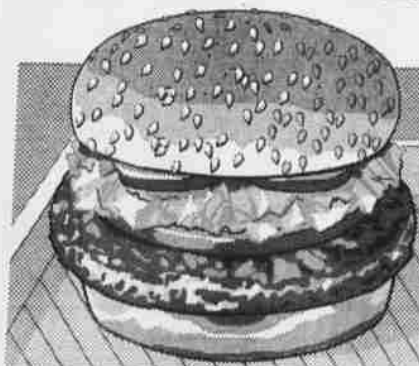
The system planned for Chicago's O'Hare and other major airports would be connected to a computer that would compare the wind patterns within 3 miles of each runway to computer models of conditions that usually precede a microburst, the most severe form of windshear. Warnings will be issued to pilots of planes taking off or landing at altitudes below 1,000 feet at least 1 minute before they are likely to encounter windshear.



SOURCE: Chicago Tribune, Lincoln Laboratory Journal, MIT; "The Downdraft" by T. Theodore Fujita, University of Chicago; Airline Pilot magazine, Raytheon Corp., Federal Aviation Administration

New, leaner burger

McDonald's will begin offering a low-fat burger in all its restaurants by the end of April. How it compares with a Quarter Pounder (no cheese) and homemade burger (ground chuck, bun, ketchup, mustard and pickle):



	Quarter Pounder	McLean burger*	Home cooked
Serving size (grams)	166	206	167
Calories	410	320	463
Protein (grams)	23.1	22	30
Carbohydrates (grams)	34	35	25
Fat (grams)	20.7	10	26.8
Cholesterol (milligrams)	86	60	86
Sodium (milligrams)	660	670	557

*Optional cheese and reduced-calorie mayonnaise would add to these figures

SOURCE: Chicago Tribune, McDonald's, American Dietetic Association

Clues to what killed the dinosaurs

Dating of a giant crater in Siberia supports the belief that massive asteroids crashed to Earth 65 million years ago, causing the dinosaurs' extinction. A competing theory is that volcanic eruptions killed the dinosaurs at about the same time.

