Natural Landing; Wind-Swept Dune Was Perfect Site for Wrights:

Last year, on the 100th anniversary of the Wright brothers' first flight, there was an eruption of media stories. I passed on the hoopla, waiting instead for what I considered the more important 101st anniversary, which will take place this Friday.

Last year's centennial was the proper time to celebrate the human achievement at Kitty Hawk. This year's 101st anniversary is the proper time to celebrate the landscape of windblown sand, which is North Carolina's Kitty Hawk to the south, and another landscape of windblown sand, New England's Bradley International Airport to the north.

The Wright Brothers didn't leave Ohio for Kitty Hawk because it was a more private place to practice their flights and forget their failures. They went for the soft, slow, steady landings that the Outer Banks of North Carolina had to offer, courtesy of Aeolus, Greek god of the wind, who blew ships across the wine-dark sea, and who sculpted the north African deserts into magical shapes.

Have you ever seen what lifeguards do to the sand at the beach? Below their viewing chairs, they fluff up a big pile of sand to jump down on when the alarm is raised. That's essentially what Orville and Wilbur did when they picked the test site for their aviation experiments. But they didn't pile up the sand themselves. Instead, they picked wind-fluffed piles called Kill Devil Hills, the largest sand dunes at Kitty Hawk. They knew that when their inevitable crashes occurred, they would be soft ones.

Have you ever seen a seagull literally float above the surf, then land ever so gradually? That's essentially what Orville and Wilbur did when they flew ever so slowly above the dune. Their average ground speed was only ten feet per second, which is scarcely faster than your average kid on a bicycle. What kept their aircraft aloft at such a low speed was a strong, steady headwind. It was strong at that time of year because of the contrast between cold air above land and warm air above water, and because the cold December air (being more dense) provided extra lift. The airflow was steady because the elongate topography of the barrier island helped guide the wind parallel to the flight path and because the air above the island, being cooler, was able to flow outward toward the lagoon to the west and the ocean to the east. This outward, slightly downward flow of air would have helped stabilize the flight by minimizing turbulent updrafts.

Have you ever seen drifting snow blow in a straight line over a smooth, ice-crusted surface? That's essentially the kind of wind regime that Orville and Wilbur found on the unvegetated, windward side of Kill Devil Hill, which resembles the streamlined prow of a ship designed to maximize speed and minimize turbulence. The lack of vegetation, caused by shifting, excessively drained sandy soils, kept the flight path as clear as ice on a pond, and almost as smooth, thereby allowing the wind to stream, rather than puff along.

The Wright brothers could hardly have picked a better place than Kitty Hawk. Everything about this place is a legacy of glacial melting since the end of the ice age. This outer bank, like the others, is a barrier island, separated from the mainland by a lagoon. Like all classic barrier islands, they formed when sea level rose against North America's gently sloping coastal plain, pushing sand into wave-tossed piles high enough to become stranded seaward from the submerging coast. Being subject to repeated storms and persistent strong winds, barrier islands grow upward as windblown dunes, even as they move landward through erosion on one side and deposition on the other.
Bradley International Airport in Windsor Locks is also a legacy of glacial melting and shoreline change. The airport sits above an enormous sand delta built eastward by the Farmington River into an enormous glacial lake that covered the Connecticut River Valley until about 12,000 years ago. The supply of sand for the delta came from the buildup of a higher, slightly older south-draining lake west of Avon Mountain that filled completely as the glacier slowly drew northward. But once the ice front reached the Farmington Gorge, all that sand washed eastward into the lower lake occupying the Connecticut River Valley. Final drainage of that lower lake left the delta as a large, smooth, slightly elevated plateau above the older lake floor. Powerful Ice Age winds then covered the dry sandy surface with an even drier mantle of windblown sand, some of which was gathered into low dunes.

When the land warmed and vegetation returned, a rich deciduous forest was unable to develop on the surface of the plateau. In its place was a dry, almost savannah-like forest of pine, scrub oak and grass. This was easy land to clear because it burned off so easily, because the stumps were easily pulled and because stone was absent. But it was poor land for grazing and pasture because it was too dry and too poor in nutrients. Prior to tobacco farming, with its irrigation, shading and fertilization, much of this land wasn't nearly as good for farming as lowlands nearer the rivers or in the hills. Hence, development was fairly limited well into the 20th century.

So, when the U.S. Army planners needed a large regional airbase during the buildup to World War II, they could hardly have found a better place than the one they found in North Windsor, on the surface of that old wind-swept sandy glacial delta. At the time, that area was a large, flat, centrally located, seasonally parched surface with less intensive development than elsewhere nearby. So, by 1941, Connecticut had conveyed a contiguous block of 2,000 acres to the U.S. Army that would later be named Bradley Field after the first aviator killed at the site. By 1947, the land had been given back to Connecticut and commercial aviation had already begun.

This, then, is a tale of two windblown places, both with an Ice Age legacy. The success of the first flight of the Wright brothers at Kitty Hawk, N.C., and the success of Bradley International Airport in the heartland of New England were no accidents of nature. In fact, the aerodynamics of barrier islands accounts for the popularity of kite surfing along them today. And other airports near Bradley Field also occur on large wind-swept deltas of glacial age.

Perhaps the Wright brothers and the planners for Bradley field succeeded because Aeolus is still with us, blowing sand here and there, and helping to keep aircraft aloft.