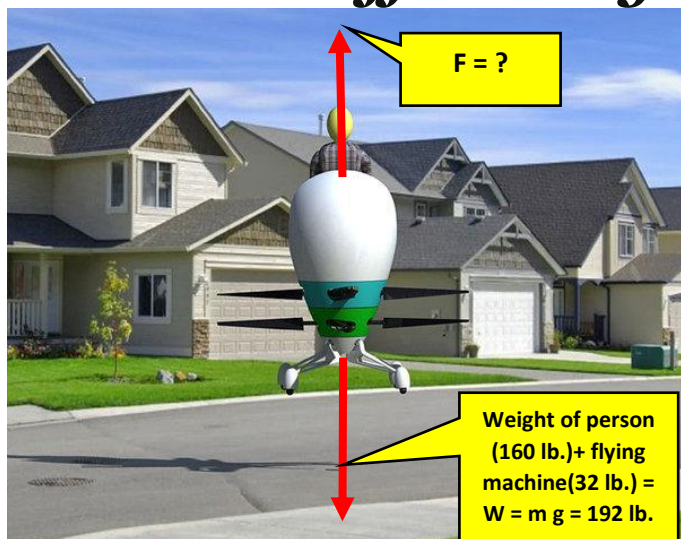


NEWTON'S 2ND. LAW

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Austin, Texas, USA, jpcise@austincc.edu & New York Times, June 14, 2018 by Zach Wichter, Dedicated to Astronaut John Glenn

Contest Aims to Lift Personal Flying Machines Off the Page



A design from Texas A&M University, one of 10 finalists announced Thursday in the GoFly contest, which is sponsored by Boeing. A final “flyoff” is scheduled for next year.

INTRODUCTION: The two props spin in opposite directions to prevent rotation of personal capsule.

QUESTIONS: (a) If machine + person accelerate vertically up at 2 ft./s.^2 find thrust F due to props? , (b) The flying machine + passenger were moving downward at 10 mph at 30 feet above ground surface and then decelerates to a stop on ground surface. First convert 10 mph to ft./s. ?, (c) Set up the working equation to find acceleration while stopping from initial 10 mph to zero in 30 feet?. Be very aware of signs and directions of velocity and acceleration vectors. (d) Find acceleration while stopping in questions (a) & (b)?, (e) Find the stopping thrust UP which caused the craft to stop in questions (a) to (c)?

HINTS: $F_{\text{NET}} = m a$, $v^2 = v_0^2 + 2 a x$, 60 mph = 88 ft./s. , $g = 32 \text{ ft./s.}^2$, $W = m g$, $m = \text{mass}$, mass in English system is slugs.

NOTE: v , v_0 , x are vectors and have direction + or -

ANSWERS: (a) $F_{\text{THRUST UP}} = 204 \text{ LB.}$, (b) $v_0 = - 8.8 \text{ ft./s.}$, (c) $0 = [-8.8 \text{ ft./s.}^2] + 2 a (- 30 \text{ ft.})$, (d) $a = + 1.29 \text{ ft./s.}^2$, **NOTE:** Positive sign, so net force is UP positive., (e) 202 lb. UP while stopping

Since at least the ancient Greeks, people have dreamed of soaring like a bird from place to place. Leonardo da Vinci's sketches of personal flying machines were ahead of their time and remain ahead of our own. Most people who want to fly today can do so only with an airline ticket and a valid form of identification. But some inventors, designers and engineers have continued to tinker, and now a contest called GoFly is encouraging them. It aims to have working prototypes next year.

“We’re at the brink of a legitimate shift in the way we travel and interact with one another,” said Gwen Lighter, the chief executive of the contest. A group of inventors and engineers organized the competition, and Boeing is the sponsor. A number of other aerospace and research firms are supporting the effort. Ms. Lighter said she expected that people would one day be able to fly for trips that they now took in cars, and that flying machines would develop along a path similar to the one automobiles followed 100 years ago. “Once these have been built and we can show people we can make them fly, it will be up to the world and the consumer to decide what is best for their needs,” Ms. Lighter said.

GoFly Prize: Celebrating the Phase I Boeing is interested in seeing what innovations develop, said Greg Hyslop, the company's chief technology officer. Boeing has no plans to build personal flying machines of its own, he added, but it does want to stay on top of new ideas. “The industry from its inception has thrived on good competition and innovation that is fueled by that competition,” Mr. Hyslop said. “We need things like this to really spark the imagination of folks and encourage them.” He also said that taking to the air could help solve some modern inconveniences, although he did not foresee flying machines as a complete replacement for ground transportation. “In developing countries, we have nonexistent or inadequate terrestrial infrastructure, and in developed cities we have creaking terrestrial infrastructure that can't keep up with the demands of society,” he said. “It begs for something to get things up in the air. Whether it's packages, cargo, people, we're going to have to use the space that's above us to meet those needs.” The GoFly competition is taking place in three phases, with the final “flyoff” scheduled for 2019. The 10 winners of the first phase, who submitted their designs on paper, were announced on Thursday. More than 100 entries were submitted, and the winning teams each received \$20,000. Some of the designs looked like giant airboats. Others looked more like motorcycles with propellers attached. One looked like a miniature airplane. Contest guidelines specified that the devices had to be quiet, compact and able to carry a single person at least 20 miles without refueling. Also, the [website](#) said, “the invention should be user-friendly and, of course, provide the thrill of flight.” All the applicants, according to Ms. Lighter, made safety a priority. **Texas A&M University had one of the winning submissions, essentially an open pilot's capsule, shaped like an egg, with rotor blades mounted near the base.** Moble Benedict, a professor of aerospace engineering at the university, said the design was meant to maximize the pilot's field of vision and make the machine easy to handle. “We want a regular person to be able to fly this thing with minimum flight training,” he said. “We have designed the control system in a way that's very stable, and it's easy enough to be flown by a novice pilot or even a regular person.”