

NEWTON'S 2ND LAW

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SpaceX Rocket Explodes at Launchpad in Cape Canaveral

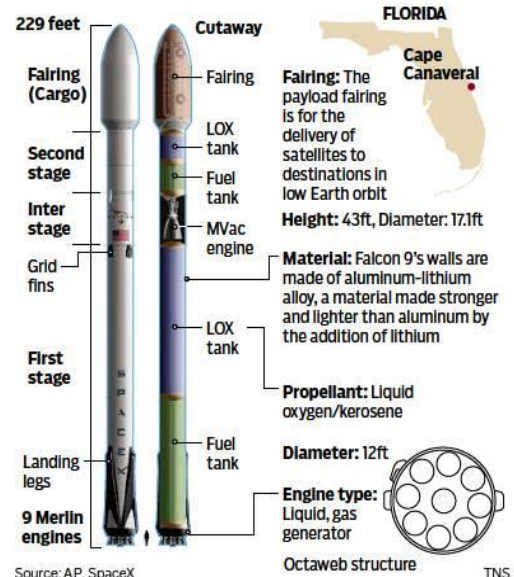
INTRODUCTION: At Space X site each rocket engine produces 845 kN of thrust. Nine engines are on the Falcon nine (see graphic at right). Total mass at lift off is 549,054 kg.

QUESTIONS: (a) Find total thrust at take off? (b) Sketch a free body diagram of forces on Falcon nine at launch? , (c) Find acceleration at launch?, (d) Ten seconds after ignition find speed of falcon nine? ,(e) How far did it go in the first ten seconds?

HINTS: weight = (mass) x gravity, $w = m g$, $g = 9.8 \text{ m./s.}^2$, $F_{\text{NET}} = m a$, $X = V_{\text{AVE}} t$, $v = v_0 + a t$,
 $x = v_0 t + \frac{1}{2} a t^2$,

ANSWERS: (a) 7,610,000 N , (b) _____ , (c) 4.06 m/s.²
(d) 40.6 m./s. , (e) 203 m.

Falcon 9 dimensions and characteristics



By U.S. LAUNCH REPORT, VIA REUTERS. [Watch in Times Video »](#)

A spectacular explosion of a SpaceX rocket on Thursday destroyed a \$200 million communications satellite that would have extended Facebook's reach across Africa, dealing a serious setback to **Elon Musk, the billionaire who runs the rocket company. The blast is likely to disrupt NASA's cargo deliveries to the International Space Station**, exposing the risks of the agency's growing reliance on private companies like SpaceX to carry materials and, soon, astronauts. The Falcon 9 rocket burst into flames in a violent series of blasts starting at 9:07 a.m., spewing plumes of dark smoke around the Cape Canaveral Air Force Station and sending vibrations felt by residents nearby. The rocket had been set to launch on Saturday, carrying a satellite for Spacecom, an Israeli company. **Launches with crews will probably not lift off before the second half of 2018, three years later than planned**, the inspector general said.

SpaceX had **hoped for 18 rocket launches this year; so far, eight have occurred**. Over all, SpaceX has had 27 successful launches of Falcon 9 rockets. An episode like Thursday's is rare. Jonathan McDowell of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass., who tracks rocket history, said the last time such an explosion happened on a Cape Canaveral launchpad, before the ignition of engines for liftoff, was in 1959. SpaceX is rebuilding a separate launchpad, one of the two formerly used for NASA's [space shuttle](#) missions, for the astronaut launches. The demise of the satellite, called Amos-6, puts a significant damper on Facebook's Internet.org initiative, a grand plan spearheaded by Mr. Zuckerberg to provide wireless connectivity to nations across the world that do not otherwise have easy internet access. In a partnership with Eutelsat, a French satellite provider, Facebook planned to use Amos-6 to offer internet coverage to large parts of [sub-Saharan Africa](#). Along with satellite coverage, Facebook is teaming with local internet providers to offer access, and is also [building its own drones — the first of which is named Aquila](#) — to beam internet connectivity down to cities.