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00:00:05,430 --> 00:00:11,830

\h A quartet of small satellites flew high above California's Mojave Desert on June 15 on a

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00:00:11,830 --> 00:00:18,230

\h demonstration mission to study the launch environment all the way from liftoff to landing.

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00:00:18,230 --> 00:00:23,850

\h The four-inch-cube spacecraft, better known as CubeSats, are being developed to help simplify

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00:00:23,850 --> 00:00:30,920

\h and lower the cost of small-satellite missions that could fly on smaller, dedicated rockets.

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00:00:30,920 --> 00:00:35,230

\h All four CubeSats were outfitted with special instrumentation to monitor flight

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00:00:35,230 --> 00:00:42,090

\h characteristics aboard the Prospector 18 rocket, built by Garvey Spacecraft Corporation.

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00:00:42,090 --> 00:00:45,960

\h One of the satellites, CP-9, belongs to California Polytechnic

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00:00:45,960 --> 00:00:49,430

\h State University at San Luis Obispo.

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00:00:49,430 --> 00:00:55,730

\h It flew alongside StangSat, created by students at Florida's Merritt Island High School.

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00:00:55,730 --> 00:00:58,500

\h Garrett Skrobot/High Altitude Demonstration Mission Project Manager: NASA We're now bringing together

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00:00:58,500 --> 00:01:01,120

\h experiments from other centers, onto a launch vehicle.

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00:01:01,120 --> 00:01:04,700

\h So it's very exciting to see these young people move into industry,

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00:01:04,700 --> 00:01:07,800

\h build a rocket, and now flying, students who

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00:01:07,800 --> 00:01:11,840

\h have built satellites, and merge these two together.

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00:01:11,840 --> 00:01:15,870

\h Both CP-9 and StangSat were designed to work together,

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00:01:15,870 --> 00:01:21,350

\h recording the launch environment and communicating with each other through onboard Wi-Fi.

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00:01:21,350 --> 00:01:24,120

\h They're slated to fly aboard a Falcon 9 rocket during

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00:01:24,120 --> 00:01:30,120

\h SpaceX's fifth commercial resupply services mission to the International Space Station.

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00:01:30,120 --> 00:01:31,760

\h Joshua Zirkle/Stangsat Program Manager

Merritt Island High School: We are having our first test

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00:01:31,760 --> 00:01:37,220

\h for the StangSat to help show that everything we've done up to this point has been correct,

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00:01:37,220 --> 00:01:41,600

\h and that our ideas are sound, and our techniques are sound,

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00:01:41,600 --> 00:01:46,200

\h and that what we are planning to do is in fact going to work.

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00:01:46,200 --> 00:01:51,400

\h Another satellite, called PhoneSat, was built by NASA's Ames Research Center.

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00:01:51,400 --> 00:01:54,880

\h It relies on smartphone features like power, memory,

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00:01:54,880 --> 00:02:00,920

\h onboard camera, and small size as a platform for low-cost spacecraft design.

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00:02:00,920 --> 00:02:05,580

\h And the Rocket University program at the agency's Kennedy Space Center contributed the

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00:02:05,580 --> 00:02:11,260

\h RUBICS-1 satellite, short for Rocket University Broad Initiatives CubeSat.

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00:02:11,260 --> 00:02:15,550

\h RUBICS was outfitted with a suite of instruments to monitor the performance of a new,

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00:02:15,550 --> 00:02:18,940

\h lightweight deployer built by Tyvak.

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00:02:18,940 --> 00:02:23,310

\h CalPoly also serves as a liaison between the payload providers and

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00:02:23,310 --> 00:02:28,920

\h NASA's Launch Services Program, and oversees the satellites' integration with the rocket.

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00:02:28,920 --> 00:02:33,060

\h In the final days before liftoff, the Prospector rocket arrived at

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00:02:33,060 --> 00:02:36,450

\h the Friends of Amateur Rocketry launch site in the Mojave Desert.

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00:02:36,450 --> 00:02:40,970

\h The CubeSat carriers were attached to the bulkhead in the top of the rocket.

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00:02:40,970 --> 00:02:47,960

\h Finally, the day before liftoff, the vehicle was raised into a vertical position -- poised for flight.

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00:02:47,960 --> 00:02:53,700

\h Launch day dawned bright and early and final preparations began.

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00:02:53,700 --> 00:03:00,120

\h At 10:52 a.m. Pacific Time, the rocket's single, liquid-fueled engine ignited,

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00:03:00,120 --> 00:03:06,440

\h and the mission was off to a roaring start, reaching a peak altitude of about 9,000 feet.

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00:03:06,440 --> 00:03:11,880

\h The rocket's parachute deployed prematurely and the vehicle continued on its trajectory,

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00:03:11,880 --> 00:03:16,700

\h coasting and tumbling to a hard landing on its side.

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00:03:16,700 --> 00:03:21,680

\h But despite the rough ride, all four CubeSats were recovered.

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00:03:21,680 --> 00:03:27,390

\h PhoneSat and RUBICS received data in flight, but sustained structural damage.

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00:03:27,390 --> 00:03:31,230

\h CP-9 and StangSat fared better, and their teams are working

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00:03:31,230 --> 00:03:34,740

\h to recover as much information as possible.

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00:03:34,740 --> 00:03:36,260

\h Brian Robusto/Merritt Island High School: Right now they're taking apart our

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00:03:36,260 --> 00:03:38,820

\h satellite to see and analyze what happened.

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00:03:38,820 --> 00:03:42,810

\h We're taking very small steps and documenting everything, also picturing,

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00:03:42,810 --> 00:03:45,670

\h taking pictures of everything to make sure that we

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00:03:45,670 --> 00:03:48,430

\h can recreate the scenarios and we can always look back to it.

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00:03:48,430 --> 00:03:53,680

\h A flight data recorder aboard the Prospector rocket also may hold important clues.

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00:03:53,680 --> 00:03:57,350

\h Tiffany Davis/Stanford University: I was able to recover my data-logger payload.

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00:03:57,350 --> 00:04:02,250

\h Little broken, but I was able to get the data card off of it,

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00:04:02,250 --> 00:04:07,110

\h and so we do have data, which is a success.

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00:04:07,110 --> 00:04:11,010

\h Rather than a setback, the flight is considered a success --

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00:04:11,010 --> 00:04:13,180

\h and a valuable learning opportunity,

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00:04:13,180 --> 00:04:18,450

\h giving teams the chance to test their designs in an unexpected environment.

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00:04:18,450 --> 00:04:21,950

\h John Garvey/Garvey Spacecraft Corp.: On the plus side, talking to the principal investigators,

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00:04:21,950 --> 00:04:25,690

\h the payload folks, most of them got data -- interesting data,

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00:04:25,690 --> 00:04:27,590

\h probably more than if we'd had a nominal flight.

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00:04:27,590 --> 00:04:30,020

\h So they're all busy looking away, trying to see what they can do -- which,

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00:04:30,020 --> 00:04:32,160

\h as a learning experience, is great.

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00:04:32,160 --> 00:04:36,740

\h More flights are planned as NASA and its partners continue the quest for a faster,

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00:04:36,740 --> 00:04:41,060

\h low-cost alternative -- by delivering CubeSats into space