



November 12-25, 2018 · Volume 180 · Number 22

FEATURES

16 | 'Grand Challenge'

Fast approaching reality, urban air mobility will transform both aviation and society, NASA says

20 | Zhuhai Airshow

New space and defense hardware in the spotlight at this year's show

44 Easing Airspace Access

The FAA is addressing burgeoning commercial space ops concerns

46 Cosmic Captive

Virgin Orbit's LauncherOne is poised for a comprehensive captive-carry flight-test campaign

50 | Japanese Aerospace

Defense exports, a future fighter and refined MRJ and a new aviation road map are on Japan's agenda

58 Staying Alive

U.S. Air Force charts quick survivability upgrades for its aging tankers and airlifters

DEPARTMENTS

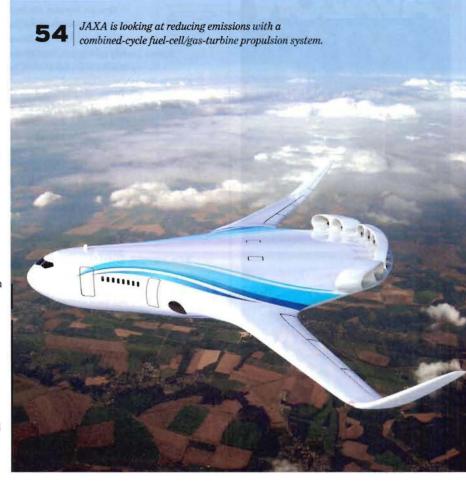
- 5 | Feedback
- 6 | Who's Where
- 8 | First Take
- 11 | Up Front
- 12 | Going Concerns
- 13 | Inside Business Aviation
- 14 | Airline Intel
- 15 | The Launchpad
- 64 | Classified
- 64 | Contact Us
- 65 | Aerospace Calendar

DEFENSE

- 26 | Belgium's F-35 decision ruffles
- European defense industry
- **28** | Russia pursues ISR and electronic warfare versions of Su-34
- **29** | Former Boeing exec shakes things up as deputy defense secretary
- **56** | DARPA/Sikorsky autonomy flights focus on human-machine interaction

SPACE

- **30** NASA and partners eye international operability standards for space
- 48 Orbex reusable green launcher is scheduled to fly in 2021
- 49 | Europe and Japan step up push for reusable launchers



COMMERCIAL AVIATION

- 31 | Lion Air probe zeroes in on faulty instruments and pilot confusion
- **36** U.S. airline fleet renewals allow focus on premium traffic
- 38 | Lagging yields temper demand optimism for Asian airlines
- 38 | Major carriers in Asia weigh widebody orders to replace fleets
- 41 | Viking Air takeover ends Bombardier turboprop era

PROPULSION

42 | Trent 7000 delays contribute to

Rolls-Royce 'perfect storm'

AERONAUTICAL ENGINEERING

- 62 | NASA wind-tunnel tests mature low-boom X-Plane design
- **62** | X-56 demos flutter-suppression flexible wing at NASA Armstrong

VIEWPOINT

66 | There are deficiencies in how the NTSB evaluates its own role

ON THE COVER

Virgin Orbit's LauncherOne rocket is heading for captive-carry flight tests after being mounted for fit checks on a specially designed pylon beneath the left wing of the company's Boeing 747-400 carrier aircraft at Long Beach, California. Targeted at the burgeoning smallsat market, the launch vehicle is expected to enter service in 2019 after an intense flight-test program. Senior Editor Guy Norris' report begins on page 48. Virgin Orbit photo by Greg Robinson. Aviation Week publishes a digital edition every week. Read it at AviationWeek.com/awst



DIGITAL EXTRAS Access exclusive online features from articles accompanied by this icon.

BUDANGTEKA