PICCOLO™ FLIGHT MANAGEMENT SYSTEMS

EXTENDED CAPABILITY FOR ADVANCED UAS APPLICATIONS

Open architecture autopilot solutions

Through twenty years of battle-proven autopilot experience, Collins Aerospace Piccolo™ flight management systems have been the industry standard – flying on more types of unmanned aircraft systems (UAS) than any other autopilot system. In response to the advanced needs of our customers, Collins has developed Piccolo Elite and Elevate, the next generation of flight management hardware and software for UAS.

PICCOLO ELITE

Our Piccolo Elite product development program has two goals:

- Develop a hardware-independent software implementation of the Piccolo autopilot firmware
- Develop an exemplar hardware platform upon which the software is run

We have moved beyond the restrictions and limitations of current hardware platforms. Piccolo Elite replaces outmoded and obsolete processors such as the MPC 5x5 series, improves sensor quality and reliability, and drastically increases onboard storage. The next generation Piccolo Elite advances the family of systems by addressing the autonomy needs of the future.

PICCOLO ELEVATE

Tested and proven, Collins Piccolo Elevate is a combined flight controller that manages vertical takeoff, transition to forward flight, transition to hover and landing for air vehicles outfitted with vertical lift systems.

Elevate autopilot firmware supports all of the fixed-wing configurations currently operated by Piccolo and can support multi-rotor lift systems using 4, 6 or 8 thrusters in standard multi-rotor configurations. Collins Elevate was designed and optimized for the new Piccolo Elite family of systems but also available for current Piccolo SL and Nano products.

KEY FEATURES AND BENEFITS

- Additional I/O support (16 configurable GPIO lines) for payload intensive applications
- Onboard inertial, air data, GPS sensors, datalink radio and EMI shielded enclosure
- Supports a wide variety of UAV's in both fixed-wing or VTOL configurations
- Software- and hardware-in-the-loop (SWIL/HWIL) simulation modes for pre-flight testing
- Portable integrated ground station capable of managing the wireless link to multiple Piccolo avionics
- Plug and play support of peripherals including:
  - TASE payloads
  - Servo-based pan tilt cameras
  - Transponders
  - Magnetometers
  - Iridium satcomm
  - RTK GPS receivers
  - Laser altimeters
  - Flight termination

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APPLICATIONS

- Fixed-wing
- Hybrid multi-rotor VTOL
- Helicopter
- Multi-rotor

PICCOLO ELITE FAMILY OF SYSTEMS

Elite MAX

- Full feature set
  - 8 Serial ports
  - 16 GPIO
  - 16 PWM with power and ground
  - 8 ADC
  - 2 CAN Bus
  - 100BT Ethernet
  - Internal GPS
  - Internal radio
  - EMI shielded case
  - Optional triply-redundant gyros and accelerometers
  - High dynamic range pressure sensor: .85 Mach IAS

Elite Classic

- Form, fit and function replacement for Piccolo II
- Uses Elite MAX autopilot processor and IMU
- Aluminum case for EMI shielding
- 8V to 30V power supply
- Optional radio-free version available

Elite Slim

- Form, fit and function replacement for Piccolo SL
- Uses Elite MAX autopilot processor and IMU

Elite OEM

- Form, fit and function replacement for Piccolo Nano
- Uses Elite MAX autopilot processor and IMU

Elite Open

- Hardware-independent software product
  - Linux based
  - TCP/IP server emulation of serial port(s)
  - TCP/IP server emulation of CAN bus
  - CAN bus used to deliver IMU data to flight software
  - CAN bus servo support
  - STANAG 4586 messaging support
  - API remains consistent with the current CommSDK supplied with Piccolo
  - Expansion of the API to support TCP/IP data streams
  - Expansion to current API to support inner loop controls
  - User access to control loops
  - 64-bit library support

PICCOLO ELITE CLASSIC SPECIFICATIONS

Mechanical

- Dimensions
  - 5.59 x 1.81 x 2.46 inches (142.00 x 46.00 x 62.60 mm) unflanged
- Weight
  - 10 oz (330 g) with 900 MHz radio
- Enclosure/mounting
  - Anodized aluminum, optional flange

Environmental & power

- Operating case temperature
  - -40° C to 80° C (calibrated range, no case)
- Power requirements
  - VIN: 8 - 20 volts
  - Power: 7 W (typical including 900 MHz radio)

General

- RS232 Payload Interface
  - 5
- CAN
  - Simulation/general interface
- Flight termination
  - Deadman output
- Digital/analog I/O
  - 16 configurable GPIO lines. 4 GPIO lines can be configured as analog inputs, 0-5V input, 10-bit conversion.

- Integrated RF data link options
  - 900 MHz unlicensed ISM, 900 MHz Australian band, 2.4 GHz unlicensed ISM
  - 310-390 MHz discrete, 1350-1390 MHz discrete, 1670-1700 MHz discrete
- GPS
  - 4 Hz uBlox module GPS receiver, 5 volt
- Pressure sensors
  - Ported static, 15-115 KPa-ported pitot, 60 KPa differential, 430+ kts indicated airspeed
  - Waypoint navigation
  - 1000 waypoints saved in autopilot
- Inertial sensors
  - 3 axis gyroscopes, 300°/sec. 3 axis acceleration, ±10g
- Supported peripherals
  - Transponders, secondary comms radios, Iridium SatComm, TASE gimbals, servo PTZ gimbals, magnetometers, laser altimeters, payload passthrough and RTK GPS

Software options

- Radio options
  - 900 MHz unlicensed ISM
  - 900 MHz Australian band
  - 2.4 GHz unlicensed ISM
  - 310-390 MHz discrete
  - 1350-1390 MHz discrete

- Standard feature set and peripherals
  - Adds new support for pan-tilt servos, improved GPS/INS performance and more flexibility in configuring payload ports
- Laser altimeter autoland
  - Provides accurate altitude information allowing the vehicle to perform a soft flared landing (laser altimeter hardware sold separately)
- DGPS autoland
  - Extends the autoland performance by using 2 cm accuracy DGPS. Supports autonomous taxi, rolling take-off, stationary and moving net recovery. Uses NovAtel DGPS equipment.
- DGPS and moving net recovery
  - Adds support of moving net recovery needed for shipboard and other moving capture applications. Uses NovAtel DGPS equipment and associated antennas.
- Helicopter Operations (VTOL)
  - Includes take-off and landing, precision hover and automated path following along with autopilot assisted manual steering modes

Elevate

- VTOL capability for properly equipped fixed-wing aircraft

Specifications subject to change without notice.

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