

## Z/I Inflight



Z/I Inflight, the successor of Airborne Sensor Management System, is Intergraph's next-generation flight management system (FMS). Z/I Inflight introduces a new level of automation, combining the power of a FMS with selectable sensor control modules (SCMs) for improving efficiency in photo flights. Z/I Inflight allows users to interface with the DMC® (Digital Mapping Camera) and RMK TOP film camera as well as other sensors on request. A variety of peripherals are supported, such as the T-AS Gyro-stabilized camera mount, different external global positioning system (GPS) receivers, and Inertial Measurement Unit (IMU) systems for direct georeferencing. Z/I Inflight simplifies aircraft camera installation by integrating several peripheral devices into one ruggedized small form factor, reducing the number of units and cables in the aircraft.

### HARDWARE AND SOFTWARE COMPONENTS

**Realtime Controller** – This base hardware platform communicates with various sensors through the use of SCM in realtime.

**Operator Display** – This touch screen-based, high-contrast display allows the operator to run the FMS controller.

**Pilot Display** – This touch screen-based, handheld computer allows the pilot to navigate the airplane according to the planned flight mission.

**Controller Box** – Includes two ruggedized PC-based embedded microprocessor boards, including:

- PC with Windows XP embedded (Service Pack 2) operating system
- PC with real-time operating system

### DESIGN

#### REALTIME CONTROLLER FEATURES

The design of the Controller has been kept simple for easier maintenance and to enable long hardware refresh cycles. This allows inexpensive and easy adaptation of future devices and sensors without any change to hardware components. The design concept allows fast in-field service and repair.

#### REALTIME CONTROLLER FEATURES

- Ruggedized hardware design
- Optical isolated inputs and outputs to external devices
- Connection to a large operator display
- Small form factor (24cm w x 34cm d x 21cm h)
- Mechanical interface for aircraft seat rail mounting provided
- Front 2 X USB 2.0 port
- Integrated 4 GByte compact flash disk
- LCD display for boot-up diagnosis
- Integrated video frame grabber (interfaces with video camera)
- Integrated L1 navigation GPS receiver (L1/L2 optional)
- Multiple interfaces to connect other peripherals
- First on the market to provide an optical, insulated Gigabit-Ethernet interface to allow tremendous data transfer rates.

#### OPERATOR DISPLAY

The large, 12-inch daylight bright color display allows the camera operator to control the system. It can also be used to display "real" image data collected during the mission to verify the image quality and, if required, to adjust camera settings. An integrated touch screen provides an easy-to-use interface for the operator during flight. Any external keyboard with integrated mouse is part of the system and can be connected if required. The Operator Display may be mounted flat or on an optional stand, it has a VESA mounting pattern on the back.

#### PILOT DISPLAY

The Pilot Display provides an uncluttered, easy-to-read guidance display, which contains information specific to the pilot's needs, such as aircraft location with respect to planned flight lines and distance to the next exposure.

## SENSOR

Z/I Inflight is designed to accommodate a variety of sensors, initially in framing acquisition mode, and eventually expanding the capabilities of the system to include push-broom designs. Also the system is designed to accommodate multiple sensors operating in parallel by using a master slave configuration with two real-time controllers for use with LIDAR. The IMU performs the function of providing precise pitch, roll, and yaw data for a priori Exterior Orientation (EO) data.

## VIDEO CAMERA

Operating the DMC and RMK TOP camera systems with Z/I Inflight, a video camera will be installed in the lens cone. The video camera is an intrinsic part of the system and provides input for several functions.

It serves as the input device to provide real-time feedback to the camera operator on the sensor ground coverage. The integrated video frame grabber is synchronized with the sensor trigger to acquire a low-resolution video image of each exposure area. It also provides input to a computation algorithm within the Controller Box that, combined with input from the GPS, performs a velocity-to-height (v/h) ratio computation used for Forward Motion Compensation (FMC) input. An additional function is to provide input to the Controller Box for a platform yaw computation. This yaw compensation is used to drive the drift control of the sensor stabilization mount (if present).

## INERTIAL MEASUREMENT SYSTEM (OPTIONAL)

The IMU performs the function of providing precise pitch, roll, and yaw data for a prior exterior orientation (EO) data. Z/I Inflight supports IGI Aerocontrol and Applanix POS IMU systems. An adapter plate will be available to mount the IMU control computer on top of the real time controller.

## HARDWARE CERTIFICATION

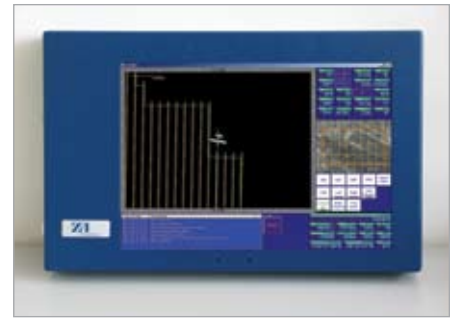
Z/I Inflight hardware is certified against the following standards:

- Electromagnetic Interference (EMI): RTCA DO 160E (ISO 7137) aircraft standard EN 55011 standard for industrial devices
- Vibration and temperature: RTCA DO 160E (ISO 7137) aircraft standard ISO9022-37 standard for electro optical devices
- Pressure tested: RTCA DO 160E (ISO 7137) aircraft standard (flight height 8000m according ICAO)
- Crash safety: RTCA DO 160E (ISO 7137) aircraft standard

## ABOUT INTERGRAPH

Intergraph Corporation is the leading global provider of spatial information management (SIM) software. Security organizations, businesses and governments in more than 60 countries rely on the company's spatial technology and services to make better and faster operational decisions. Intergraph's customers organize vast amounts of complex data into understandable visual representations, creating intelligent maps, managing assets, building and operating better plants and ships, and protecting critical infrastructure and millions of people around the world.

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Z/I Inflight operator display



Z/I Inflight real-time controller