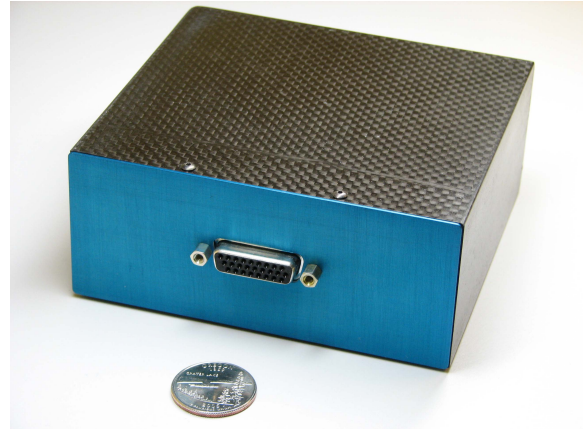


SatCam: Satcomm Imaging System for Ultra Low Bandwidth Satcomm and UHF datalinks

Now with realtime image mosaicing and
orthorectification!

Airborne Innovations is proud to introduce
the SatCam imaging system.

SatCam is a miniature satellite
communications imaging solution,
compatible with the Iridium and Globalstar
satellite networks. This system enables
remote imaging anywhere in the world, anytime.



SatCam UAV Imaging System

This is an enabling technology for small over the horizon capable UAVs. Some UAVs weighing less than 15 kg are capable of endurance over 24 hours, and can fly out of line of sight range easily within one or two hours. Previous UAV systems have relied on images 'stored on board', which does not allow inflight interpretation of imagery and retasking of the aircraft.

The system combines the best available low bandwidth optimized image compression technology with a robust image transmission protocol capable of transmitting streaming still images over ultra low bandwidth links.

Developers can integrate the imaging system with their own datalink and/or camera, or users can drop in a ready to go independent imaging system. Also suitable for remote security- dial into a camera anywhere in the world and get realtime images.

Features:

- Supports satcomm (Iridium / Globalstar ready) or transparent UHF datalinks
- Cloud Cap Piccolo Ready
- Compression selectable so the user can trade off quality and transmission time
- Ready to use camera and compression module, or customizable to a variety of camera and image capture solutions.
- GPS and aircraft attitude input
- Realtime image mosaicing, georeferencing, orthorectification, map display features
- Multi-Megapixel imaging over UHF also available (UAV Megacam RT product)

Preliminary Specifications:

Imaging module only:

Power consumption: <2.5W

Weight: <120 grams

Transmission time for typical usable color 640x480 image: 15 seconds over 2400 baud link(!)

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SatCam System Architecture

The SatCam system typically consists of a compression board, digital camera or video capture device plus multiple analog cameras, Iridium modem, and antenna for the remote system, and a PC, Iridium modem, and antenna for the base station. The compression board performs image compression and runs a datalink protocol for robust image transmission via satcomm. The system is optimized for single channel Iridium communications at 2400 baud.

The system is also capable of operating with a transparent serial link which may be provided by the user, typically a payload serial channel provided by a UAV avionics, or some other transparent serial datalink.

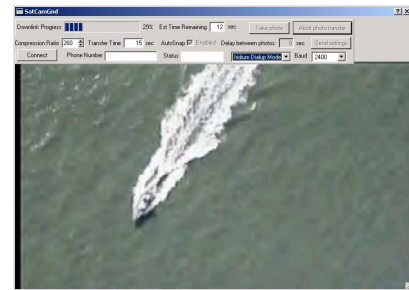


Image sent in 15 seconds via Iridium satcomm

Image Compression

The system uses wavelet image compression technology for excellent quality at extremely low bandwidth. Image detail is preserved where it is necessary, and compression ratios of 250:1 and higher produce good quality images (an order of magnitude better than JPEG). The user can trade off quality vs. image transfer times. Reasonable quality 640x480 images can be transmitted via single channel 2400 baud Iridium satcomm in as little as 15 seconds.

Image Transmission

A custom reliable image transmission protocol is used which is optimized for the Iridium link. This guarantees complete image reception even if the link performance is not 100% reliable, and maximizes the use of bandwidth. It is also designed to perform well under satcomm latency characteristics.

Recommended configurations

We recommend a configuration consisting of light weight and low power compression hardware, analog video capture + digital camera, and a repackaged Iridium modem.

The power & weight budget of a typical remote configuration is as follows:

Preliminary Specifications

<u>Component</u>	<u>Weight</u>	<u>Typ Power</u>
Image compression & transfer module	<112g	2.5W
(misc extra weight subject to optimization)	67g	-
Video capture unit	110g	2W
Repackaged Iridium Modem	180g	4W (typical operating)
Iridium Antenna, cable, gndplane	43g	-
Total (less cables)	~512g	8.5W

Custom configurations, source code, and video capture solutions are also available.

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