

Comparison of Trackair/POS-AV510 and IGI CCNS4/AEROcontrol under operations with a VEXCEL UltraCam-D

Preamble

For the purchase of new sensors (Digital Camera, Hyperspectral Scanner) IFMS/DIMAP has to decide, which GPS/INS-system is to be purchased. In the season 2005-2006 in Australia & New Zealand, both systems were in practical operations in combination with different VEXCEL UltraCam (UCD) models.

This statement is giving a short summary of the operations with both systems and is a base for a general choice.

Mission Planning

Trackair:

The system offers an easy to use planning tool based on a couple of Windows applications. Planning and change of planning is easy, full graphic based. The planning of lines in mountain areas is not supporting DTM integration. Country modules, for instance for New Zealand, are not on the actual status. Changes of flight plans in the air are possible. The usage of backdrop maps is possible but slows down the system.

WinMP/CCNS4:

This system is focused to the main issues for a mission planning. The graphical user interface expects more training, the results are more secure. The usage of backdrops for DXF is very good; shape files can be operated. The usage of DTMs for mountain areas are supported.

Data Transfer to the Crew

Both systems allow the transfer of data from the office to a remote operating crew. The IGI solution produces smaller packages for the planning. So the data can be send by satellite modems or slow lines. The notebook is only necessary in the hotel/office. In case of backdrop maps in the planning from the Trackair system, the files for the transfer are getting very large.

Flight Management

Trackair:

The system gives the operator a graphical user interface running on a notebook. The pilot can't interact over his screen, what's especially on long missions a disadvantage. Especially on flights with a high repetition rate of images (less than 1,5 sec between the frames), the system has problems in the interaction between the Trackair and the UCD. Sometimes the signal which is coming back from the UCD is not recorded by Trackair. This rate can be up to 15% of all images.

CCNS4:

The CCNS4 does not expect an in-flight notebook for operations. This is especially useful in higher altitudes in an unpressurized cabin. The installation with two screens (pilot/operator) gives also the pilot the possibility of interactions. The standard usage with a minimum of buttons (push-turn) is good to include in the work surrounding of the pilots. Pilot-only operations are possible! There were never problems of the interactions between the UCD and the CCNS4.

IMU Integration

POS-AV510:

The integration of the POS-AV in the UCD camera is easy. The included Trimble GPS-Receiver had problems with the initialization. In 20% of all cases the time to get from the system a solution for the position was longer than 15 minutes, in maximum up to 2 hours. The IMU was working properly with a rate of 200 Hz. The storage of all data on the internal flash card had several times problems, which could be fixed by using the internal backup of the POS-AV. Two times in the five month operations with the system, the complete system crashed in the middle of the mission.

AEROcontrol:

There were IMU's with a rate of 64Hz and 128Hz in use (optional 256Hz). The typical initialization time was less than two minutes, problems with crashes etc. have never been registered. The system was not sensitive for bad satellite constellations, also rough flying conditions in low level flights over the Australian Outback didn't cause any problems.

Mission reporting

Both systems have solutions for an easy mission reporting. The possibilities of the Trackair are more graphical. Mount handling:

Both systems have solutions to send a drift correction value to different mounts. The communication works over the serial ports. Found problems were mount based.

GPS/INS Post-processing

POSPROC:

The post-processing of the data from the POS-AV has three phases and can be done only in the Applanix software. The usage of the PosGPS (GrafNav) is similar to the IGI solutions, but it is impossible, to integrate other solutions then the PosGPS in the GPS-trajectory. The POS-AV510 did not deliver all times continuous data for a stabile solution. In 10% of the cases, the final result includes only the realtime solution.

There is no possibility for combining/synchronizing of event numbers and image numbers of the UCD. This workload has to be executed manually at the end of the processing and have caused a couple of problems. There are sometimes events missing (less then 1%).

AEROcontrol/AEROoffice:

The usage of ASCII files for GPS-results in the processing allowed the integration of different GPS-processing systems and is very flexible, especially in the different situations in Australia (usage of AUSPOS etc). The connection between the events and the image numbers is easy and can be done from the operator directly after the flight. There never have been missing events.

Borsight Calibration

Both systems are offering solutions for the calculations of the borsight parameters. The internal Applanix solution could not get working with the UCD-imagery. The usage of external AT results is working. The IGI solution does include BINGO-30, the 30 model version of BINGO AT software, which has shown excellent results for system calibration and the search of individual effects.

System stability

Looking to the installation and the system stability, the IGI system is less spectacular looking for the user but more stabile working. The IGI system never had problems in the last two years of operations.

Final decision

DIMAP is working since weeks with an integrated CCNS/AEROcontrol/OmniSTAR-HP system from IGI for real-time GPS operations in Australia with excellent results. We have chosen IGI for this task, because special solutions and problems are easier to handle with the IGI crew. Applanix isn't helpful at all with the integration of customer requests (data formats, adaptations, etc.).