MAV
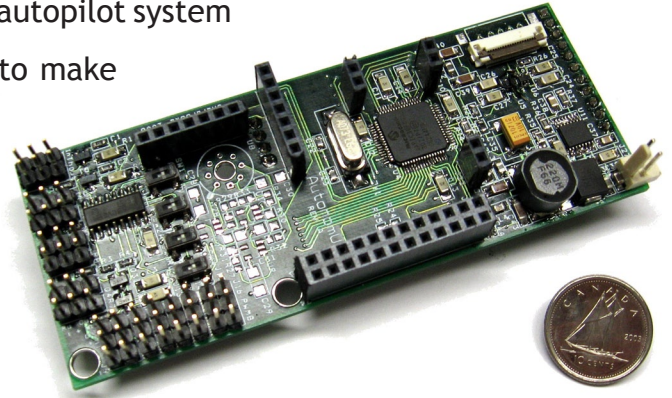## *AutoPilot*
2007

Partnership plan

http://mav2007.hexpresso.org/

The Project

The *MAV AutoPilot* project mission is to develop an autopilot system for Micro Aerial Vehicles (*MAV*). Our main goal is to make the aircraft capable of following a predefined path by itself while being able to monitor the miniature vehicle progression using a graphical user interface (containing the flight data, the flight plan, the actual aircraft position given by GPS, etc.), located at the ground station.

The *AutonomUS* board, developed by *MAV AutoPilot*
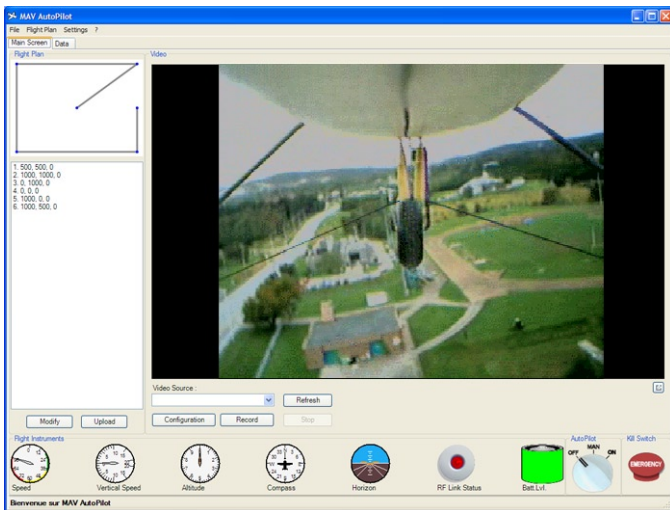
Ground station graphical user interface

Our group works in collaboration* with our client, the *VAMUdeS* (Véhicule Aérien Miniature de l'Université de Sherbrooke) group, which develops miniature aircrafts in order to take part to various competitions around the world. Our purpose is to allow *VAMUdeS* to use its own autopilot system, and thus improve its performance during competitions.

In order to make it happen, our solution is made up of three important parts: the ground station, the central embedded system located within the aircraft (the *AutonomUS* board) and the embedded software.

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* Please note that we are not part of the *VAMUdeS* group in any way.

Current Progress
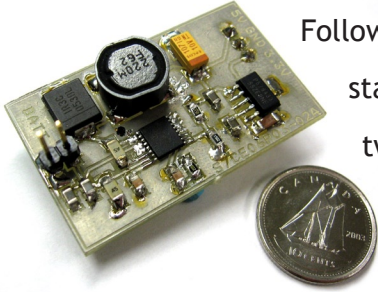
Power module

Following a request made by the *VAMUdeS* group, the *MAV AutoPilot* project was started in January 2006 by the *MAV2006* team. During the year, an average of twelve undergraduates in both computer and electrical engineering were asked to complete the design of the autopilot system. While they did not fully accomplish this by December 2006, the team noted down a list of potential features that could be useful for the future of the project.

A brand-new team of 8 members (*MAV2007*) has been mandated to take over the project (January 2007). As requested by the *VAMUdeS* team, they will be asked to increase the performance of the autopilot system by adding a number of new features.

" Autonomy was valuable in terms of points and offered a lot of interesting possibilities "

— *VAMUdeS team*

The MAV2007 Team

The development of a complete autopilot system is extremely complex and involves a lot of effort and commitment. The actual *MAV2007* team is made up of 8 undergraduate engineering students from the Université de Sherbrooke, who are each completing the final year of their Bachelor's studies, with an equal number of members in electrical as well as computer

The *MAV AutoPilot 2007* team

engineering. We are all highly motivated to work on this large scale project.

Objectives for 2007

The objectives of the *MAV2007* team were defined according to the needs of our client. First, we need to build a new PCB of the *AutonomUS* board in order to fix some design errors, in addition to preparing the prototype board to host the new features that will be added this year. We also have to design an alternative gyroscope system to ensure the stability of the aircraft as it is being controlled by our autopilot system.

The team's testing aircraft

Another major objective that will be achieved by our team will be to increase the range in which the miniature aircraft can be flown.

February 10, 2007 public presentation

Among all new features that will be developed this year, we ought to mention the camera control module that will be present on the aircraft. This will allow the ground station team to remotely control the camera position. We also plan to add the *force feedback* feature on the *joystick* of the ground station, and increase the amount of useful flight data displayed on the graphical user interface. These new features will be beneficial in particular to the pilot when he is flying in manual mode. We also aim to implement the *CAN bus* protocol on the *AutonomUS* board in order to increase the amount of I/O.

Finally, we hope to take part in future Micro Aerial Vehicles competitions in order to gain exposure for the *MAV AutoPilot* project within the *MAV* community.

Budget

A project of the size and complexity of *MAV AutoPilot* needs a great deal of financial and material resources. The accomplishment of our goals will inevitably require the support of various organizations and private companies. Here is a brief budget for the year 2007 :

Expenses

AutonomUS board PCB making We plan to build two prototypes this year (we need to make 2 PCB per prototype)	$700.00
Electronic components used in the development of the *AutonomUS* board This includes the alternative gyroscope system and the camera control module	$600.00
CAN bus development kit It will be used to increase the number of I/O available using the *CAN bus* protocol	$180.00
Magister miniature aircraft and maintenance parts A new aircraft kit is mandatory in case of a crash of our actual aircraft, which is aging rapidly	$700.00
Joystick with *force feedback* It will be used to add the *force feedback* feature to the manual control modes of the aircraft	$120.00
Pilot insurance Our pilots must be insured against accidents	$150.00
Total	**$2450.00**

Revenues

Grant given for projects carried out at the end of the bachelor cycle Electrical Engineering and Computer Engineering department of the Université de Sherbrooke	$500.00
Total	**$500.00**

Amount needed in partnerships: $1950

Visibility and Other Benefits for Our Partners

A financial or material partnership with *MAV AutoPilot 2007* has its advantages! In particular, you will be contributing to a group of highly motivated future engineers, and helping us in accomplishing a unique, exciting and high-calibre project. In exchange, we can offer your company an increased visibility and exposure — not only in the local university scene, but on an international level as well.

Partnership Scale

Visibility, advantages and privileges	Bronze (250$ and more)	Silver (500$ and more)	Gold (750$ and more)	Platinum (1000$ and more)
Logo on our website (http://mav2007.hexpresso.org/) Logos will be located on the " Partners " page	●	●	●	●
Logo on a large poster It will be displayed during various public presentations and competitions	●	●	●	●
Logo on the door of our development lab Great visibility among engineering students at Université de Sherbrooke			●	●	●
Logo appearing within our academic documents Including official reports, presentations, etc.		●	●	●
Logo on promotional clothing This T-shirt will be worn mainly during public presentations		●	●	●
Logo appearing in promotional videos Videos will be accessible on our website and presented to the public			●	●
Better visibility for your logo for the points stated previously Your logo will be proportionally larger to assure an excellent visibility			●	●
Logo on our miniature aircraft Excellent visibility on all our photos, videos, public demonstrations, etc.				●
Logo located at the top on every page of our website Excellent visibility for anyone visiting our website				●

Note: For technical or material support, the visibility that will be given will be proportional to the amount of money saved by MAV AutoPilot.

MAV *AutoPilot* **2007**

Acknowledgments

In the name of the *MAV2006* team, we would like to thank the following organizations for their precious support. Thanks to them, the *MAV AutoPilot* project has now become reality! We very much hope that you will join our excellent team of partners for the year 2007!

UNIVERSITÉ DE
SHERBROOKE

SUNSTONE
CIRCUITS

MICROCHIP

Further Information / Contacts

For any questions, do not hesitate to contact us! It will be our pleasure to give you more information about the *MAV AutoPilot 2007* project.

Also note that we are open to suggestions. If we can better suit your company's needs by making adjustments or additions to the project as outlined above, we would be very willing to discuss the possibilities with you.

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http://mav2007.hexpresso.org/

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