

AUTONOMOUS MISSION FOR ON-SITE SERVICING (AMOSS)



How drones will shape our lives in years to come

Recap

- ✿ The **AMOSS** project was inspired by the AMOOS (Autonomous Mission for On-Orbit Servicing) project.
- ✿ AMOOS is a team project that is part of the Space Studies Program (SSP) of the International Space University (ISU) to be held at the campus of **École de technologie supérieure** (Montreal, QC) from June to August 2014.
- ✿ The AMOOS project proposes innovative autonomous missions to service operational and defective satellites in orbit using drones or Unmanned Aerial Vehicles Systems (UAVS).
- ✿ The AMOSS project is primarily intended to promote the civilian use of drones and will benefit from the AMOOS project results.

Abstract

- ✿ The AMOSS Project represents direct spin-offs of the AMOOS project for civilian life.
- ✿ The immediate impact of AMOOS project : 'AMOSS'
- ✿ The question behind AMOSS project:
How drones will shape our lives in years to come?



Objectives

The concept behind AMOSS project is:

- 1) **Promote** civilian use of low-cost drones in daily-life.
- 2) **Provide** new applications and services for the following areas: → Commercial Airspace Missions, → Land Management, → Earth Sciences, → Civil Surveillance.
- 3) **Exploit** the direct outcomes of AMOOS project to promote new applications on earth.
- 4) **Propose** new challenges / perspectives for Canada's Space industry.

Challenges

How drones are changing the way we do business?

- ✿ **For drones: increase technological capabilities**

Our proof-of-concept Lab and field experiments of AMOSS will assess the following capabilities of modified drones such as **(a)** better degree of autonomy, **(b)** greater endurance flight and long range efficiency, **(c)** precision navigation in all weather conditions, **(d)** safer terrain detection and collision avoidance, **(e)** over-horizon remote control and command, and **(f)** quick deployment/retrieval and operation from Ground Control Center.



- ✿ **For new applications in everyday-life**

The AMOSS project will demonstrate the capabilities of a fleet of drones

- **For automated and quick delivery systems:** to pick up, distribute and deposit packages and medicines in both urban airspace and remote regions of Canada.
- **For first aid/disaster relief:** to assist emergency services during search and rescue, forest fires, avalanches, or to penetrate dangerous areas.
- **For civil surveillance:** to survey land farming, seaways, road traffic, etc.
- **To be continued....**



Scope of new perspectives

The AMOSS project will combine **creativity, efficiency** and **high quality** solutions for everyday-life in the following areas:

Promote civilian use of drones

The AMOSS project will promote an open innovation model in which a fleet of low-cost drones will be used to provide faster, better, cheaper and safer solutions for everyday-life under (a) commercial missions, (b) land management, (c) Earth Sciences, and (d) Civil Surveillance.

Propose technological showcase for civilian drones

The AMOSS project will provide a technological showcase for civilian drones and Unmanned Aerial Systems (UAS) to assess their performances in urban airspace. To achieve this, three types of drones will be tested: → Quadcopter (for precision navigation), → Flying wing (for long range efficiency), and → Helicopter (for lifting heavy loads).

Provide new researches perspectives for Canada

The AMOSS project will propose fresh and innovative concepts for Canada's aerospace industry to create new types of UAVs and satellites, based on the AMOOS 'unique' experience.

Exploit the spin-offs of AMOOS project experience

The AMOSS project will use AMOOS results to provide methods to, (a) analyze the logistics and operations required by on-site servicing, (b) to train highly skilled UAS pilots, sensor operators, and mission commanders with the ability to provide decision-making support and (c) to maintain and support the entire lifecycle of a 'low-cost' drones fleet.



FUTURE of COMMERCIAL DRONES



Opportunities

Why participate in AMOSS? This project sets high expectations for **Canada**, including:

- Strategic benefits for industry:** advancement of civil drones' research, Stimulus to economic growth, etc.
- Access to urban airspace:** commercial aerial surveillance, goods delivery....
- Civil surveillance:** land farming, transportation of hazardous goods, road traffic, sea and inland waterways...
- Emergency missions:** communication relay, disaster relief (forest fires, avalanches, tornados...), pollution detection, search and rescue (seas, mountains, wastelands...)
- Infrastructure inspections:** pipelines, railways, plants, bridges, hydroelectric dams, high-voltage lines...
- Industries:** geophysical surveys in exploitation and production of oil, gas, mineral...Geomagnetic surveys to observe Earth structure
- Scientific researches:** cartography, meteorology, atmospheric, geodesic and oceans studies.
- Specific missions:** motion picture filmmaking, Earth 3D imaging, communication...



Partners (to be completed) : Join us !



Contact

Prof. René Jr. Landry
 ETS, 1100 Notre-Dame Street West • Montreal, Quebec, Canada,
 H3C 1K3
 +1 (514) 396-8506
ReneJr.Landry@etsmtl.ca
www.lassena.etsmtl.ca