
Safety Plan for

ACROSS - Atmospheric Chemistry of the Suburban Forest

Project and Data website: <https://www.across.aeris-data.fr>

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Project abstract:

ACROSS (Atmospheric ChemistRy Of the Suburban foreSt) is an integrative, innovative, multi-scale project within the “Make Our Planet Great Again” (MOPGA) initiative designed to advance understanding of the fate of the photochemical processing of urban and biogenic air mass mixtures in the Paris region. An ACROSS hypothesis is that the anthropogenic-biogenic air mass mixing leads to changes in the production of oxygenated volatile organic compounds (VOCs) whose properties alter their importance in incorporation into secondary organic aerosols (SOA) and their roles in production of ozone and other relevant secondary species. A likely important factor is NO_x transport to suburban biogenic environments and the resulting modification of key chemical processes.

A key highlight of ACROSS is an intensive, multi-platform measurement campaign that will take place in the summer of 2022. The campaign includes a 40-meter tower and ground-based measurements in the Rambouillet suburban forest to the southwest of Paris, airborne regional observations across Paris and suburban forested areas, and several other multi-instrumented ground sites located in the urban, rural, and semi-rural Paris region. The data collected from this campaign will provide a unique snapshot of the properties and mixing of urban and biogenic air masses around one of the most populated and polluted European megacities. This new knowledge will contribute to the advancing of our understanding at the process level and lead to the ability to represent such complex systems in numerical models, ultimately resulting in improved capability to predict the impacts on air quality, regional climate, and global climate change.

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ACROSS - Atmospheric Chemistry of the Suburban Forest

1. Philosophy of Safety

1a. Overall Concepts

The management and execution of a complex field measurement project requires careful attention to protocols of safe usage of infrastructure and platforms. ACROSS is a project with two primary ground sites, an aircraft based at an airport and several partner sites (SIRTA, ICARE, H2C, sTREEt). It is important that everyone working at or visiting these sites is aware of the rules for their use with the goal to have zero injuries or accidents during the ACROSS preparation, execution and completion of the campaign. To achieve such a goal requires the cooperation and communication between everyone involved to keep the environment as safe as possible.

In addition to protocols for the use of infrastructure and items needed to operate instruments, it is also important to know what to do if an accident or injury should occur. This includes making use of communication channels to inform the points of contact at the site where the incident occurred. Thus, the advice in the Safety Plan goes hand-in-hand with that in the Communication Plan.

The goal of this document is to identify for the reader those hazards that could cause harm or injury, and then to describe actions to minimize the danger associated with those hazards.

1b. Components of Safety

Persons. Adhering to safety rules protects the individual and the people who are nearby and could be surprised by the consequences of an accident. Therefore, it is important that everyone follow the rules. Each person needs to be responsible for their own safety as well as those around them.

Locations. It is important to follow safety protocols at a variety of locations. In addition to the obvious situations such as working on the top of the tower or on the aircraft, it is important to be vigilant in other situations such as driving to and from sites (e.g. narrow, slippery roads with deep ditches), using tools, and even hiking in the woods. Let's use care regardless of where we are.

Training. For some particularly hazardous situations, training on the use of facilities is required. This includes tower usage training and aircraft crew training. For other less hazardous situations, the training can be more informal, relying on documents such as this one and advice from project leaders.

Self-awareness. Working long days for weeks on end can lead to a type of fatigue not familiar to many people. Therefore, each person needs to evaluate their current status to assess whether they can perform the duties of their job safely and effectively. If the answer is no, do not hesitate to take a day off or to request another team member to take over your duties.

2. Site Specific Safety Protocols

This describes the safety protocols for each ACROSS site and platform.

2a. Rambouillet Forest Supersite

When in full operation, this will be the most crowded site in the ACROSS project. There could be more than 20 persons on site during the active periods, and there might be activities on the ground and tower both day and night. This requires strict adherence to safety guidelines.

Presence on site

1. When arriving at the site, sign in on the participant logbook in the Office Container
2. When leaving the site, sign out on the participant logbook
3. When other activities occur (e.g. deliveries) that might affect the measurements, work together to note those in the site activities logbook
4. When working on the site, but temporarily leaving (e.g. to have lunch away from the measurement location), notify someone (preferably the POC) of your absence and when you expect to return.
5. Park vehicles in the designated area to minimize contamination of the site by fuel evaporation and exhaust emissions.

Working on the Ground

The site will consist of several (10) containers and trailers, some with inlets on top and others with sampling lines going to the glass manifold. There will also be power running from the electrical boxes to each container. Typically, researchers will need to have their container placed, followed by preparation of their instruments to sample the species of interest. Then in the routine measurement phase, calibrations and instrument maintenance will be needed to keep the measurements operating at the highest quality. At the end of the measurements, there will be disassembly of components and preparation for the container or trailer to return to home base. When working on the ground, follow these rules:

1. Avoid entering the restricted buffer area around the tower (3-5 m) unless you intend to climb the tower or perform maintenance on items mounted on the tower or other activity that requires proximity to the tower.
2. When working outside within or near the buffer area, you must wear a hard hat.
3. When working on the top of a container, use safety equipment if practical. Be very careful to not fall off the container.
4. The ground within the measurement enclosure is not very flat. Use caution when walking and avoid running.
5. If you are the last to leave, ensure the gate is properly padlocked (key and combination lock connected to each other) so that the gate opens with the key or the combination.
6. If you notice anything abnormal (smoke, strange sound, unusual smell), notify the POC immediately.
7. Provide on the outside of each container contact information for a team POC and the team members. Make use of this information if something is out of ordinary. Keep in contact via email and mobile phone in case there is an issue with your equipment.
8. Avoid being near the instrument community exhaust.
9. Do not work alone at the site. Always have at least one other person on site.
10. If you have a minor injury, use the first aid kit on site. If you have allergies, make sure that you bring your medication with you. Notify your team POC of any relevant health issues.

11. When walking in the site area or taking walks in the wider region, be aware of animals. Keep a vigilant look out for snakes, and other small animals as well as larger animals common to the area. This includes various types of deer, wild boar, and birds of prey,

Working on the Tower

Climbing and working on the tower are extremely dangerous. These actions require the maximum attention and care to avoid mistakes.

1. All persons climbing the tower must take and pass training.
2. When climbing the tower, follow prescribed protocols.
3. When climbing the tower, use prescribed safety equipment (safety harness, hard hat).
4. When ascending or descending the tower with equipment, tools or supplies, carry the items in a backpack security attached to your body. Do not carry extreme weights up or down the tower.
5. When working on the tower, use extreme care not to drop tools or other objects. If feasible, tie off tools and other objects so they cannot fall to the ground.
6. Because working on the tower is dangerous, make use of remote internet access to instruments, when possible.
7. If someone gets sick while working on the tower, contact team and/or site POCs to help assess the situation and determine what actions should be taken. Do not attempt to climb down the tower alone if you do not feel well.
8. There may be a davitt to transport items up and down the tower. Use extreme care with this device and warn people on the ground that you intend to use it. Have a person on the ground tether the item being moved and have one or more people on the top to receive the item or help guide it to the ground.
9. Do not work on the tower in the following conditions (this means don't climb the tower if these conditions exist, and if you are on the tower and these conditions arise, immediately descend):
 - a. Windy or gusty conditions (> 8 m/sec)
 - b. Wet conditions (currently raining or recent rain that leaves the stairs wet). Make sure that mud is not transported onto the tower steps.
 - c. Lightning visually present or thunder audible
 - d. Severe weather in the area
 - e. Extremely high temperatures (> 30 °C) or low temperatures (< 5 °C).
 - f. Twilight or dark conditions ($jNO_2 < 0.001$ s⁻¹). Approximately after 22:00 or before 06:00.
 - g. You feel ill or dizzy. You have a fever or chills. You are tired.
 - h. Alone
- 10.

2b. Franczal Airport, Pontoise Airport, and the ATR-42

The safety issues working at airports and on the ATR-42 aircraft will be managed by Safire. This document can be found on the Safire website:

https://www.safire.fr/doc/Consignes_Seurite_ATR42.pdf

Please refer to this document and consult Safire staff to comply with safety on the aircraft and at the airport.

2c. Université Paris Cité (PRG)

Measurements on the PRG campus will be based on the seventh floor of the Lamarck Building. Protocols similar to those at the site and on the ground at Rambouillet (section 2a) will be employed. The number of persons involved in ACROSS measurements at PRG will be much smaller than at Rambouillet, but safety protocols must still be followed.

Presence on site

1. When arriving at the site, sign in on the participant logbook in the Office Container
2. When leaving the site, sign out on the participant logbook
3. When other activities occur (e.g. deliveries) that might affect the measurements, work together to note those in the site activities logbook
4. When working on the site, but temporarily leaving (e.g. to have lunch away from the measurement location), notify someone (preferably the POC) of your absence and when you expect to return.

Working in the lab

1. Kj;asdkfj;asdf

Working at the measurement site

1. Kj;asdkfj;asdf

2d. SIRTA

Rules for security and safety while working at SIRTA are located at the following site: <https://sirta.ipsl.polytechnique.fr/ressources.html> under the tab "Security rules". Please refer to those documents and consult SIRTA staff when working at SIRTA.

3. Dealing with Injuries

While we hope, because of strict adherence to safety protocols, that no one is injured during the ACROSS campaign, preparations must be made to deal with minor or major injuries, should they occur. Injuries can be minimized by using care, in being aware of one's surroundings, by employing proper safety equipment, and by using tools properly. See specific suggestions in the site specific safety protocols.

3a. Minor injuries (not requiring professional intervention)

If a minor injury occurs, make use of first aid kits located at the various sites. If you are unsure how to deal with the injury, contact the site point of contact (POC) and consult reliable sources of

information. Be forthright with the fact that you have been injured. Honestly assess whether the injury precludes continued working safely, and whether you should stop working (for hours or even days). Even minor injuries can cause shock, which can result in dizziness and possibly collapsing.

After the initial first aid, continue to nurse the injury (e.g. replacing bandages) until healing is well underway. If you consulted a doctor, continue to follow the directions provided.

3b. Major Injuries (possibly requiring professional intervention)

If a major injury (severe bleeding, broken bone, unconsciousness) should occur, take the following steps to provide aid to the injured person and to properly inform emergency workers.

- If you encounter someone who is injured, remain calm. Try not to panic or overreact.
- Secure the accident site. Safely move away from any dangerous conditions, if necessary. Try not to cause additional injury.
- To the best of your ability, assess the injuries.
- Call emergency services (SAMU, Police, Pompiers). These numbers are stored throughout the site and in this document. Be ready to provide the following information:
 - Location of the accident. This information is stored throughout the site and in this document
 - Describe what happened.
 - Tell how many people are injured
 - Describe the nature of the injuries
 - Answers the questions asked by the dispatcher
- Provide first aid
- Promptly inform the site POC

When the injured person has been taken care of, and you have had a chance to calm down, write a detailed description of what happened before, during, and after the accident while the information is still fresh in your mind.

4. Self-Policing of Safe Operations

Each person working on the site should be aware of all safety protocols. If you see someone not following the procedures, calmly and clearly explain to them what they are doing incorrectly. Use this document as a reference to back up your points. If the person continues to break protocols, contact the site POC. Unsafe work during ACROSS will not be tolerated.

5. Preparing to Work in the Field

As you preparing to work in the field, remember that you will likely be some distance from home, and that items that would normally be readily available to you might not be at the measurement site and at your in-field housing. Therefore, consider the following as you prepare to work in the field:

- Bring needed medications with you (daily medicines and others “as needed”, for example for allergies)
- Bring medical records (shots, medical conditions.) that could be needed

- Know your body (blood sugar, food, personal issues that could need attention – e.g. back issues, previous injuries). Eat regular meals and avoid over extending your capabilities.
- Know your limits (weight that can be lifted, moving items) – ask for help
- Work together. Help each other.

6. Actions taken to Maximize Safety

In preparation for the ACROSS campaign, the project leadership will take the following actions:

- Inform SAMU of our location and type of work, so they are ready should a serious accident happen.
- Local emergency clinics are informed of our location and type of work.
- ###other actions###

7. Emergency Contact Information

SAMU	15
Police	17
Pompiers	18