Clemson University Upper Atmosphere Research Program
Information Sheet
2015-2016

The upper atmosphere research program in the Department of Physics & Astronomy deals with improving our understanding of the effects of solar storms on the Earth's space environment, namely the region of space where the International Space Station and many satellites operate. This region is located between 60- and 300-miles above the surface of the Earth, much higher than altitudes that can be reached by aircraft, for example. Our studies therefore include rocket measurements carried out by NASA of the behavior and properties of the space region during periods of solar activity.

The rockets mostly carry electronic instrumentation. One of the measurement techniques used in a few of the rocket launches is the release of small amounts of some of the same metals used to create the colors in fireworks displays. The metal releases occur in space but are visible from the ground. Their movement can be used to understand how the space environment responds to and is affected by solar storms.

The quantity of metal that is used is considerably less than in a typical Fourth of July fireworks display, and the releases occur in space rather than near the ground, as is the case with fireworks. Launches of this type occur, on the average, about once per year. All launches are announced on the NASA/Wallops Flight Facility web site (https://www.nasa.gov/centers/wallops/home).

Clemson has been involved in the analysis of the rocket data to improve our understanding of the Earth's near-space region, but the rocket launches are carried out by NASA and all aspects of the launches, including any potential safety issues, are the responsibility of NASA.

Clemson does not represent or speak for NASA, but the following information may be helpful to anyone concerned about the safety of NASA's rocket program, including the metal tracers:

More information about the rocket tracer studies can be found at the following NASA web site: https://www.nasa.gov/mission_pages/sounding-rockets/tracers/index.html

The safety aspects, as well as other information, are discussed on the following NASA web site: https://www.nasa.gov/mission_pages/sounding-rockets/tracers/faqs.html

Periodically NASA carries out Environmental Planning and Impact Assessment studies that include very detailed assessments of the safety of all aspects of the rocket program. The results of the studies are freely available to the public and can be found on the following NASA web site: http://sites.wff.nasa.gov/code250/documents.html

Good contacts for further information about all aspects of the NASA sounding rocket program, including the tracer studies, can be found at the following web site:
https://www.nasa.gov/centers/wallops/business/code130.html
The contact information for Mr. Keith Koehler, a public information officer for the NASA/Wallops Flight Facility, is provided on the web site. Mr. Koehler has been especially helpful in answering questions from the public about the program.

There is sometimes confusion about whether the rocket tracer studies are related in some way to aircraft exhaust. Aircraft fly at altitudes well below the space region that is the focus of our research. The Physics & Astronomy Department at Clemson, as well as the faculty, staff, and students in the department, have **no** research programs related to or in any way involved with aviation, including aircraft exhaust or contrails.