



# Mars 2020

## Radiological Contingency Planning

# NASAfacts

NASA plans to launch the Mars 2020 rover, Perseverance, in summer 2020 on a mission to seek signs of habitable conditions in Mars' ancient past and search for signs of past microbial life. The mission will lift off from Cape Canaveral Air Force Station in Florida aboard a United Launch Alliance Atlas V launch vehicle between mid-July and August 2020.

The Mars 2020 rover design is based on NASA's Curiosity rover, which landed on Mars in 2012 and greatly increased our knowledge of the Red Planet. The Mars 2020 rover is equipped to study its landing site in detail and collect and store the most promising samples of rock and soil on the surface of Mars.

The system that provides electrical power for Mars 2020 and its scientific equipment is the same as for the Curiosity rover: a Multi-Mission Radioisotope Thermoelectric Generator (MMRTG). Essentially a nuclear battery, the MMRTG contains 10.6 pounds (4.8 kilograms) of plutonium dioxide as a heat source used to

produce the rover's onboard power and to warm its internal systems during the frigid Martian night.

NASA prepares contingency response plans for every launch that it conducts. Ensuring the safety of launch-site workers and the public in the communities surrounding the launch area is the primary consideration in this planning.

This contingency planning task takes on an added dimension when the payload being launched into space contains nuclear material. The primary goal of radiological contingency planning is to enable an efficient response in the event of an accident. This planning is based on the fundamental principles of advance preparation (including rehearsals of simulated launch accident responses), the timely availability of technically accurate and reliable information, and prompt external communication with the media and general public.

The response effort includes assessing if and how much radioactive material was released, as well as its possible location, in order to formulate recommendations for appropriate protective actions.

The Radiological Control Center (RADCC) at NASA Kennedy Space Center (KSC) is the primary facility where the coordination of any launch site radiological contingency response would take place. The RADCC's functions include data collection and assessment, management decision authority, and a public information center.

The data collection and assessment center uses information from a network of remote monitoring devices called Environmental Continuous Air



*The Radiological Control Center at NASA's Kennedy Space Center is the primary facility where response planning for any launch accident involving the nuclear material aboard Mars 2020 will take place. Credits: NASA/JPL-Caltech*

Monitors (ECAMs) and from teams of personnel using specialized radiation detection equipment. Monitoring data are electronically reported back to the operations center.

The ECAMs deployed for the Mars 2020 launch are updated versions of those used for the launch of Curiosity. The ECAMs will be distributed strategically around the launch area, including several locations guided by the specific weather forecast for launch day, and will be in operation well before launch to ensure reliability.

Mobile field teams will be deployed prior to launch to provide ground measurement data. These teams include experts in industrial safety and health physics, in addition to the fire, safety, and emergency medical teams that are on alert for every launch.



*An Environmental Continuous Air Monitor (ECAM) deployed in the field. For the Mars 2020 launch, 30 of these sophisticated environmental monitoring systems will be deployed in the area surrounding the launch site prior to launch. Credits: Department of Energy*

The management decision authority group includes senior management representatives from NASA, Department of Energy (DOE), Environmental Protection Agency (EPA), Federal Emergency Management Agency (FEMA), United States Air Force (USAF), Brevard County and the State of Florida.

A public information center staffed by multiple agencies will develop and disseminate information concerning protective actions at the launch site and recommendations for the surrounding communities, in consultation with the management team. Accident status messages would be distributed for use by launch site public affairs staff. Information would also be made available via the web, text messaging, and social media feeds, which will be widely advertised before launch.

Accurate and prompt information on the status of the launch and any actions recommended for the public in the event of an accident would be communicated widely and openly to the news media and to people in the surrounding communities, primarily via the Brevard County Emergency Operations Center.

Information about the risks associated with a launch of this type and the appropriate emergency response will be made available publicly, in advance, so that area residents and visitors can take precautionary measures in the unlikely event of a launch accident.

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