



UAV-Based Mobile Gamma Spectrometry

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IAEA UAV Project

After the Fukushima-Daichi accident the IAEA started a project to develop a UAV-based system for rapid environmental mapping. As part of the IAEA Nuclear Safety Action Plan the project was partially funded by the Government of Japan as project NA9/2. The goal of the project was two-fold: To provide the IAEA with a system for quick response in case of a nuclear emergency and to produce a prototype system for Fukushima Prefecture to support environmental remediation. The prototype system for Fukushima Prefecture was successfully delivered in July 2016.

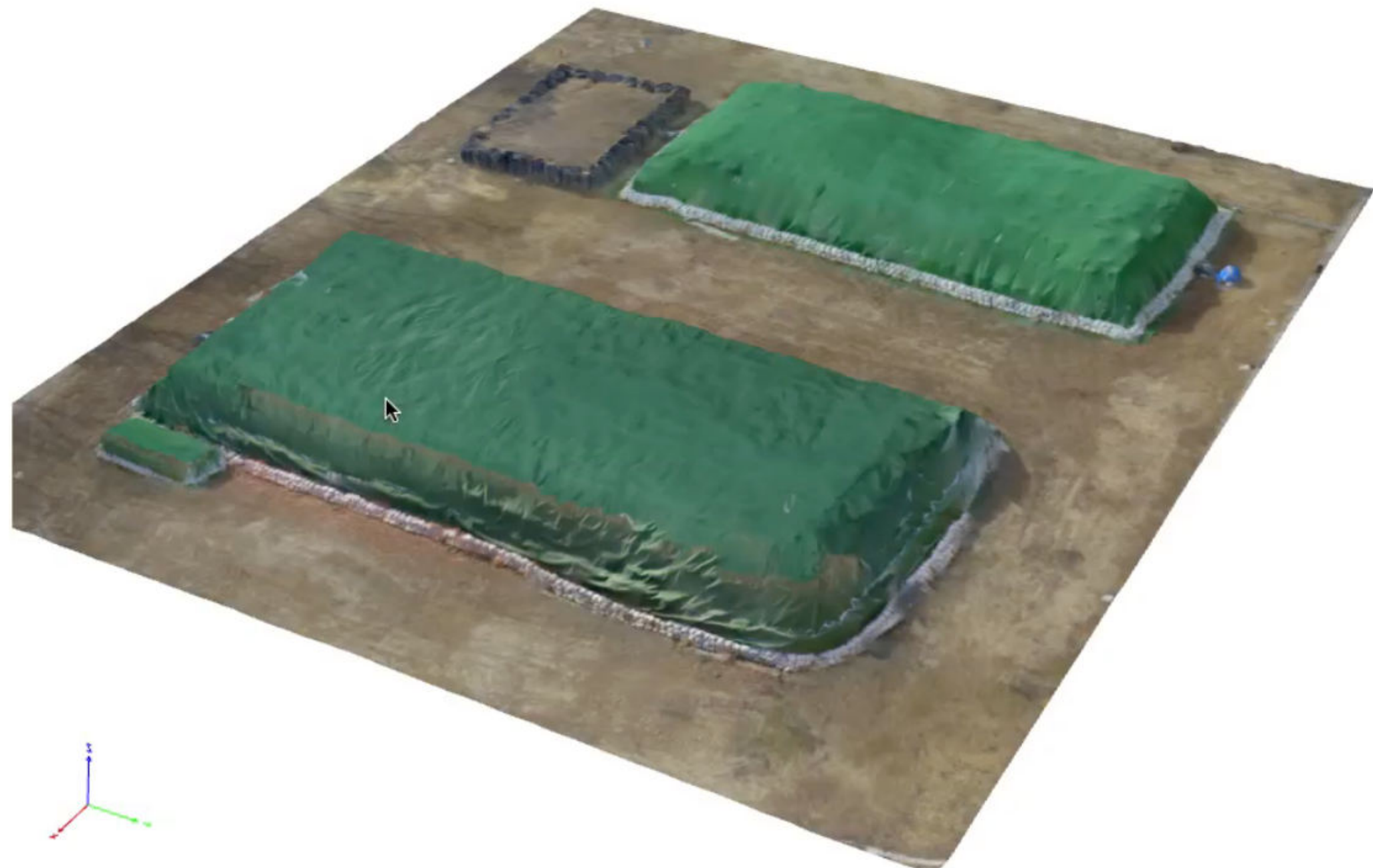
The system is based on an Aibotix X6 hexacopter as platform, with a high-resolution Leica Global Navigation Satellite System (GS14) using information from GPS, GLONASS, Galileo and Beidou satellites and an integrated laser altimeter.

The hexacopter carries different cameras and detectors, depending on the task at hand: high resolution cameras, small cameras e.g. Hero GoPro 4, 3-channel Geiger-Müller counter, Safecast single channel Geiger-Müller counter and LaBr spectrometer.

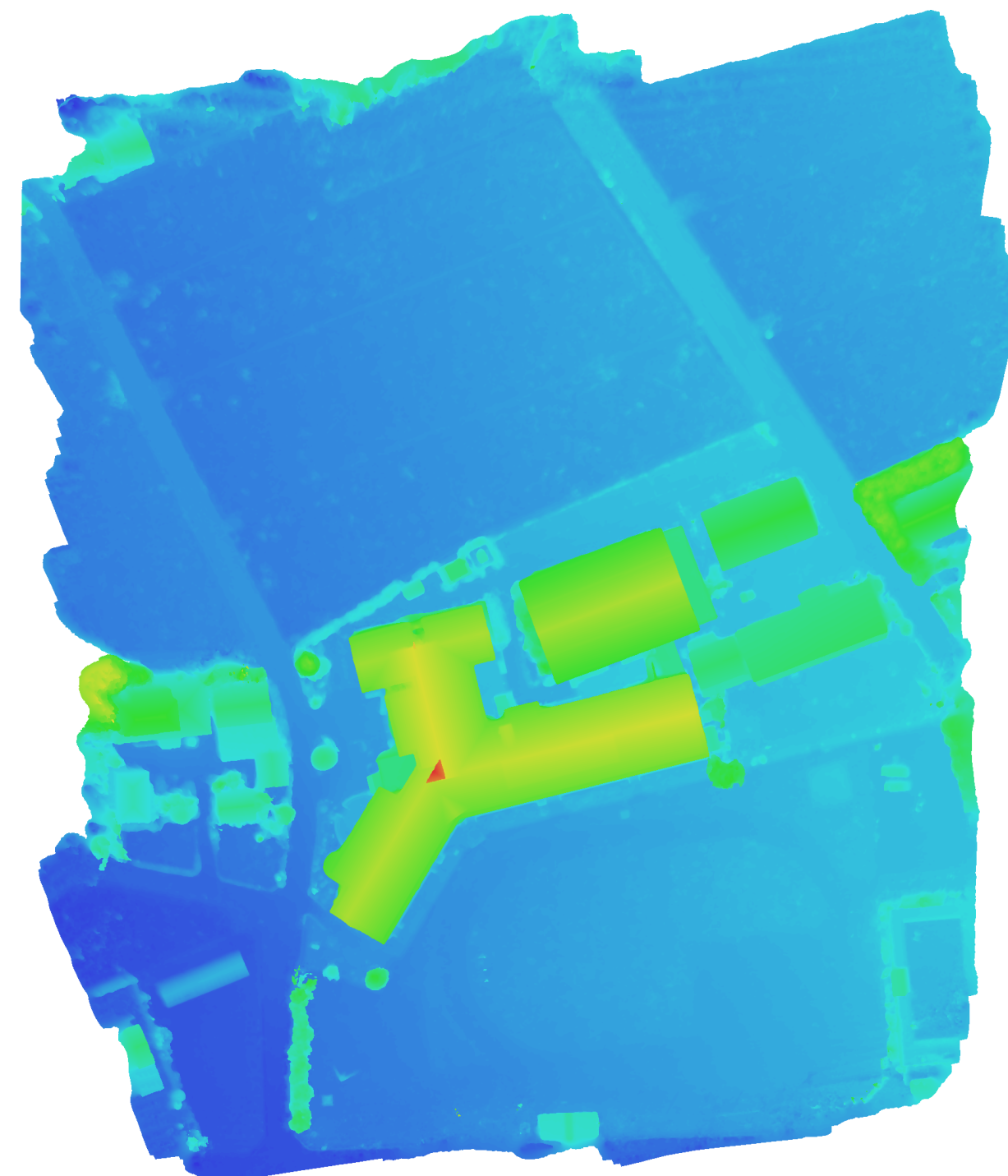
UAV-based Systems

UAV-based systems fill the gap between large-scale helicopter-based aerial surveys and car-based or walking surveys. They are less expensive and have better resolution than helicopter-based surveys, are faster than walking surveys and cover areas that otherwise are inaccessible. In an emergency situation a UAV-based system can measure unknown radiation levels without exposure for the human operators. Radiation data are available via online telemetry

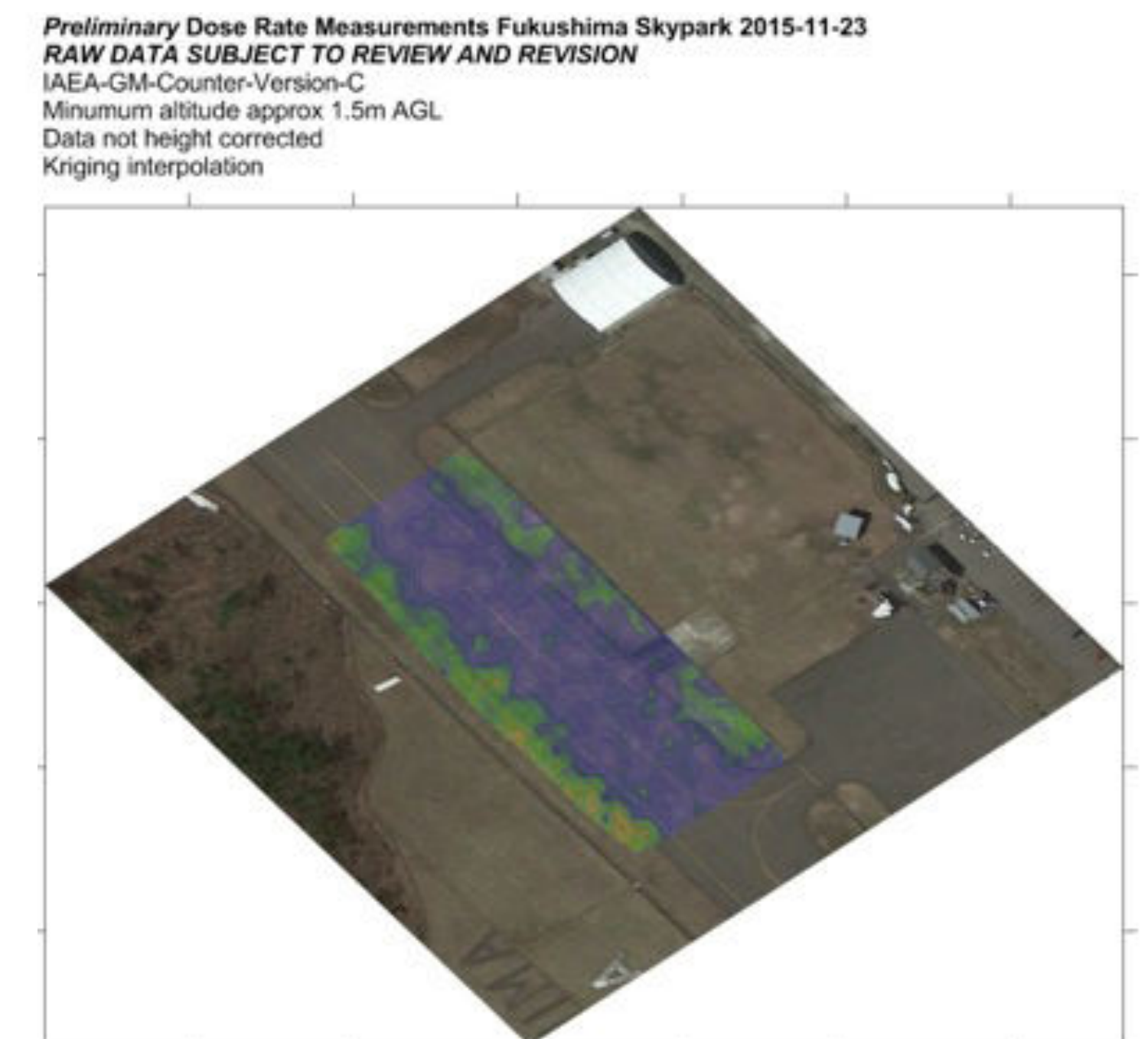
The UAV system provides a number of different ways to analyse the data, in combination with the appropriate software: High resolution orthophotos, 3D models with photographic resolution, elevation models and radiation maps. In combination these provide ideal tools for site documentation.



3D Model with photographic resolution (Temporary Storage Site, Fukushima)



Elevation Model (Elementary School site with buildings and fields)



Radiation Map (Fukushima Sky Park, Japan)

First IAEA UAV Remediation Mission

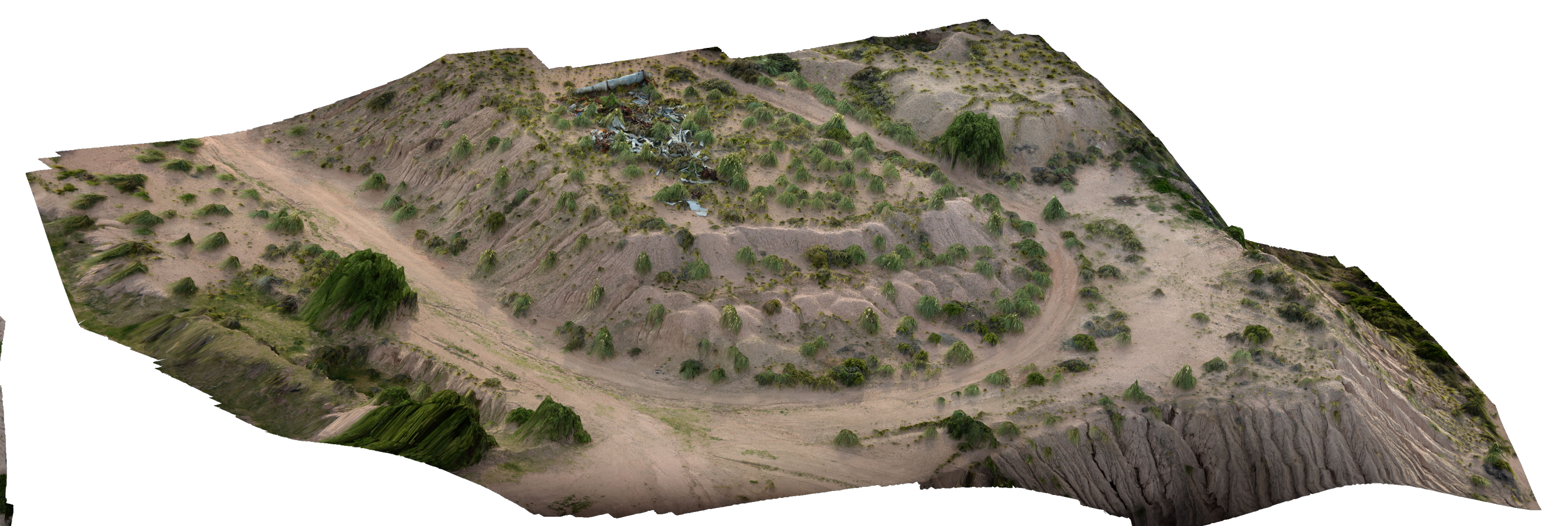
The first successful field-test of the IAEA UAV system took place in February 2016 at the site of a Uranium mine in Argentina. Mine tailings were documented in high-resolution orthophotos and 3D models and radiation maps were created using a 3-channel Geiger-Müller counter.



Data collection. Operator I. Darby, IAEA.



High-resolution orthophoto of mine tailings



Side view of 3D Model with photographic resolution

