Local Plume Map Algorithm Description Document

Overview

This data product supports the Safety Map requirement SM. ALG.10: “SPOC shall generate a site-specific plume input map of Bennu overlaid with the TAG approach trajectory.” This map calculates the number of dust plumes present in the TAG site and encountered on the associated approach corridor.

Inputs

- Global Shape Model (GSM)
    - Nominally 1m resolution
- Bounding approach corridor ground tracks
- Local Deliverability Map (LDM)
- Sampling site radius (circular)
- Global Dust and Gas Plume Geology Map

Outputs

- Site-Specific Plume Safety Map
    - Referenced to the GSM

Algorithm

The sampling area is either defined by the Local Deliverability Map boundaries (referenced onto the Global Shape Model), or alternatively the user can input a single scalar for the sampling site area radius instead of the LDM. The higher resolution of the Local Topographic Map is not needed for this algorithm; both the sampling site and approach corridor can be evaluated using the GSM.

For each GSM facet within the sampling area:

1. Determine if the facet is fully or partially contained within a plume defined by the Dust and Gas Plume Geology Map

For each GSM facet contained within the bounding trajectory ground tracks:

1. Determine if the facet is fully or partially contained within a plume defined by the Dust and Gas Plume Geology Map

A color coded safety rating will be assigned to the each facet of the sampling area or approach corridor:

a. Green if the facet is not contained or partially contained within a plume
b. Red if 1 if the facet is contained or partially contained within a plume