The OSIRIS-Rex Team has identified the Nightingale site as the place where they will try to obtain a sample later this year. This image is overlaid with a graphic of the OSIRIS-Rex spacecraft to illustrate the scale of the site. Nightingale is located in a northern crater ~140 m wide. Nightingale’s regolith is dark, and images show that the crater is relatively smooth. Because it is located so far north (see below map), temperatures in the region are lower than elsewhere on the asteroid and the surface material is well-preserved. The crater also is thought to be relatively young, and the regolith is freshly exposed. This means the site would likely allow for a pristine sample of the asteroid, giving the team insight into Bennu’s history.

Although Nightingale ranks the highest of any location on Bennu, the site still poses challenges for sample collection. The original mission plan envisioned a sample site with a diameter of 50 m. While the crater that hosts Nightingale is larger than that, the area safe enough for the spacecraft to touch is much smaller, ~16 m in diameter, resulting in a site that is only about one-tenth the size of what was originally envisioned. This means the spacecraft has to very accurately target Bennu’s surface. Nightingale also has a building-size boulder situated on the crater’s eastern rim, which could pose a hazard to the spacecraft while backing away after contacting the site.