



Company Background: SSR Mining Inc. is a Vancouver-based mining company focused on the operation, development, exploration and acquisition of precious metal projects. SSR Mining has three operations, including the Marigold mine in Nevada, the Seabee Gold Operation in Saskatchewan, Canada and the 75% owned and operated Puna Operations joint venture in Argentina.

Additionally, SSR Mining has two feasibility stage projects and a portfolio of exploration properties throughout North and South America. The Company is also focused on growing production and mineral reserves through the exploration and acquisition of assets for accretive growth while maintaining financial strength.

Overview: In 2016, SSR Mining began looking into a commercial drone mapping solution for its mining operations in North America. Towards the end of the year, Identified Technologies offered a fully managed solution that could provide accurate information in a short period of time and the flexibility to get survey grade data for a wide variety of areas.

Key Benefits: SSR Mining recognized several key benefits of the Identified Technologies software, including: cloud-based remote access, quick data processing time, increased accuracy versus manual surveying methods, and access to unlimited flights.

SSR Mining also used a drone to decrease the frequency of its regular site aerial surveys. A drone provides the capability to survey sections of the property where there have been changes on a regular basis, making it possible to extend the period between comprehensive flyovers up to 3 years reducing overall cost.

SSR Mining found a wide variety of use cases for drone technology used by Identified Technologies. Surveyors are updating the topography of the mine site every week to measure mining progress, and mine operations is using 3D models in meetings to assist with analysis work. Many departments at the mine site

use the drone for a wide range of projects. Current examples include:

Construction department: Flying the drone over construction sites allows for monitoring of construction progress. The department can compare the data with cut and fill numbers to assist with cost management and meeting engineering design specs.



A Leach Pad at the Marigold Mine in Valmy, NV

Process department: Drone surveys of the leach pads allow operators to easily determine which cells are dry (often a result of plugged drip tubing) or locate which areas have too much solution, which helps avoid wasted resource costs, as well as ensure protection of wildlife and alleviate concerns over pad slope stability. (A leach pad is a lined pad where

a dilute cyanide solution is applied onto precious metal containing ore to extract the precious metals, such as gold and silver, from the ore. The solution is fully recovered to further process and extract the gold from the solution, while also recycling the water.) By identifying problem areas aerially, operators can immediately respond and repair or make corrections to flow volumes, greatly reducing the foot travel and man hours required for inspections. By optimizing the solution application, operators are able to maximize gold extraction in the least time possible while reducing potential impacts to wildlife.

Technical Services department: Uses drone technology for reporting and reconciliation. The department flew the drone over extraction pits then used Identified's proprietary change detection technology to compare the progress to designs. In one instance, drone technology was used to survey an area not accessible by foot or light vehicle. SSR Mining found that if it doesn't need to put people on the ground for surveying, the process can be safer and more efficient.

Environmental department: Used the drone to fly over a newly constructed landfill to keep track of the disturbance. Because the mine is allotted a certain amount of acres to disturb, the drone can help efficiently track disturbance in real time, versus using surveyors on foot at the end of a month or end of a quarter. In addition, other environmental uses, such as monitoring dam stability and effectiveness of wildlife protection measures (such as excess solution on the leach pads, or appropriate coverage of process ponds) can be done easily with a quick drone flight.

Exploration department: Has implemented drone technology for many functions. Since SSR Mining can map 100 acres in 10 minutes with a drone, it can update surface topography maps that can be paired with core samples to create block models of potential new exploration areas. Where these areas are remote, the drone can also be used to identify the location of new roads that are needed to move heavy pieces of machinery into place for core sampling.



Results: SSR Mining has been able to save both time and money using drone technology. With traditional methods, it took 20 hours of surveying and processing labor to obtain a detailed survey of a specific section of the mine site. Using Identified Technologies drone solution, the same results were achieved with 1 hour of work. This has allowed SSR Mining to increase speed and productivity, without increasing staffing costs and headcount, while decreasing the frequency of its full site flyovers.