



# DRY CARGO *international*

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*Eco-coal as eco-friendly product.*

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*The world's leading and only monthly magazine for the dry bulk industry*



**Coal & Fertilizers  
Shiploaders**



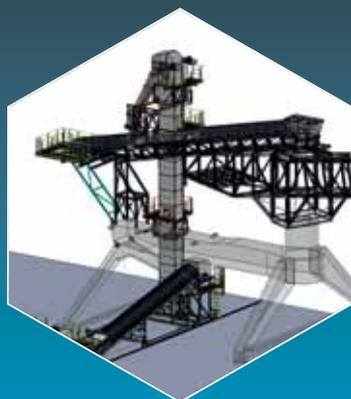
**Tilting  
Spreader**



**Feeders**



**Weigh  
Hoppers**



**Terminal  
designing**



**Turn-key  
solutions**

## **BULK HANDLING EQUIPMENT**

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## **Radar-based 3D stockpile inventory scanning and position tracking to achieve stockpile automation**

Real-time inventory visibility and management occupy an essential role across the sequence of processes involved in the production and distribution of a commodity. The location, number and capacity of mining and port operations within complicated supply chains mean that their operational efficiency has a major impact on the markets they supply. The likelihood of bottlenecks in a supply chain that consists of commodities being sent from one asset to another is extremely high. A mine sends material via rail to a port (with limited stockyard capacity), where a ship brings it to another port, from where the material may require further handling before reaching its destination.

Every asset along the supply chain has many sources of variations and interdependencies. The key to improving productivity is dealing with the weakest link in the chain and managing capacity buffers to ensure the weakest part of the chain can perform, even when other parts of the chain become inactive. Hence, material buffers are key to production rates.

Unfortunately, increasing storage space is capital-intensive in the bulk materials industry as it requires scarce real estate and capital equipment. Besides that, bulk handling operations generate dust, often requiring covered installations. Consequently, the question can be raised: how can a mine improve buffering capacity and increase production without large capital projects? iStockpile from indurad offers a smart way for increasing live capacity.

### **WHAT IS iSTOCKPILE?**

iStockpile is a sensor-based scanning system, which has been specifically developed for rough conditions in the mining industry. It fulfills the following tasks and services:

- ❖ real-time and permanent volume and level measurement of the entire stockpile;
- ❖ reliable dead stock measurement for precise timing agendas (e.g. material that always remains in stock);
- ❖ works reliably in extreme levels of dust and humidity;
- ❖ one-time calibration with zero maintenance; and
- ❖ improved stockpile utilization and better buffering capability.

### **HOW iSTOCKPILE HELPS**

3D modelling of the stockpile can be performed using 3D iSDR sensors mounted on the portal or roof structure of the storage. There are options for mobile as well as stationary sensor solutions. The radar sensors can provide both inventory information and serve as collision avoidance sensors at the same time.

This solution allows for zone-based volumetric stockpile control even under challenging conditions with steep craters and rat holes beyond the natural angle of repose. The solution is fully modular and can be customized to fit any stockyard configuration in all types of operating conditions, including dust, heat, rain, snow, ice and fog.

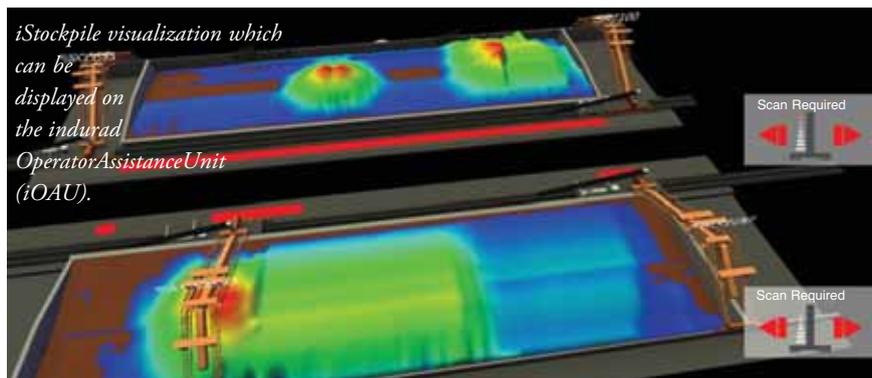
### WHAT IStockPILE OFFERS

The iStockpile solution offers the following advantages for operators — all three options lead to an overall higher stockpile capacity. This is done by increasing availability, throughput, and transparency. iStockpile automation projects are offered with site audits & performance guarantees by indurad.

- ❖ Enabling remote stockpile operation based on positioning, stockpile scanning and camera integration: highly accurate machine positioning is realized by employing GPS, radar, and encoder integration — providing the client with a complete digital twin of operations. During operation, complete stockpile scans are achieved using 2D radar sensors on the machine boom which deliver real-time inventory information about 3D volumes during machine movement. At all times, safe remote access is available via the indurad iREMOTE unit.
- ❖ Providing **assisted operation** with machine movement features: this includes the definition of reclaiming patterns and the determination of ideal face-up points. By monitoring the stacking process, dust generation can be mitigated by controlling the boom height. By monitoring the volume flow rate on reclaimer boom conveyor belts, the bucket wheel throughput can be controlled. Additionally, collision avoidance functionalities can be implemented for preventing potential unwanted events of machine to pile and machine to machine.
- ❖ Improving machine **productivity** and key operation parameters: the allocation of zones/sections to the incoming material within the stockyard is possible by using volume information provided



*indurad's iSDR scanner and iLDR scanner for stockpile management system in the US.*



*iStockpile visualization which can be displayed on the indurad Operator Assistance Unit (iOAU).*

by the client on incoming volumes/times (input/output to be defined). Besides that, a stacking and reclaiming plan can be generated (method, pile selection). Important stockyard inventory information like age, grade, supplier, etc. within a block model can also be realized.

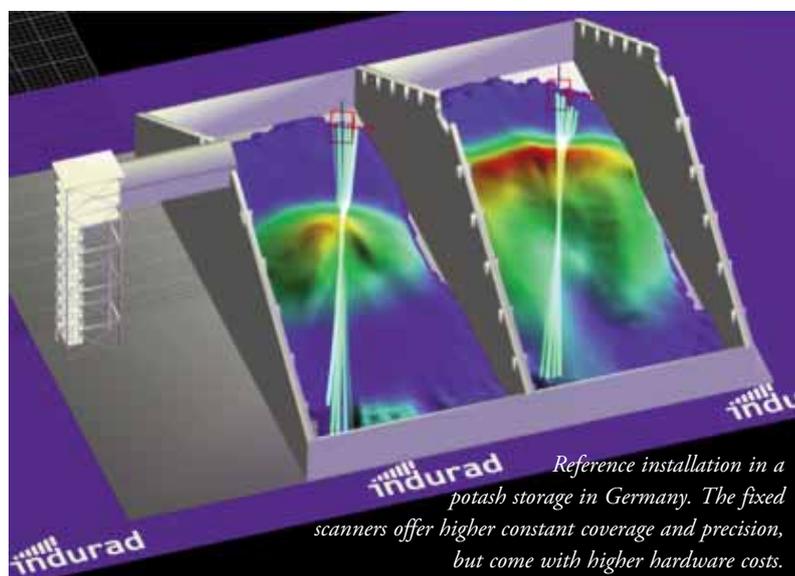
indurad's solutions are used to debottleneck bulk materials handling systems in mining and port operations. indurad has successfully implemented stockyard inventory and automation solutions in Australia, Africa, Latin America, Middle East, Europe, and North America. indurad's proprietary sensors are part of a multi-purpose solution family that covers real-time inventory control, 2D and 3D stockpile visualizations, machine positioning with high accuracy, speed and volume flow control for conveyor belts, shiploaders, and more. indurad has partners and clients in the mining, marine, and bulk materials handling industries on all continents and has local offices in Australia, Brazil, Canada, Chile, Russia, and South Africa.

### WHERE IStockPILE WORKS

iStockpile has been implemented in multiple industries all over the world, with clients in Australia, Africa, Latin America, Middle East, Europe, and North America.

### ABOUT INDURAD

indurad is a Germany-based global supplier of radar-based automation technology.



*Reference installation in a potash storage in Germany. The fixed scanners offer higher constant coverage and precision, but come with higher hardware costs.*

