Holistic systems approach on Loadout

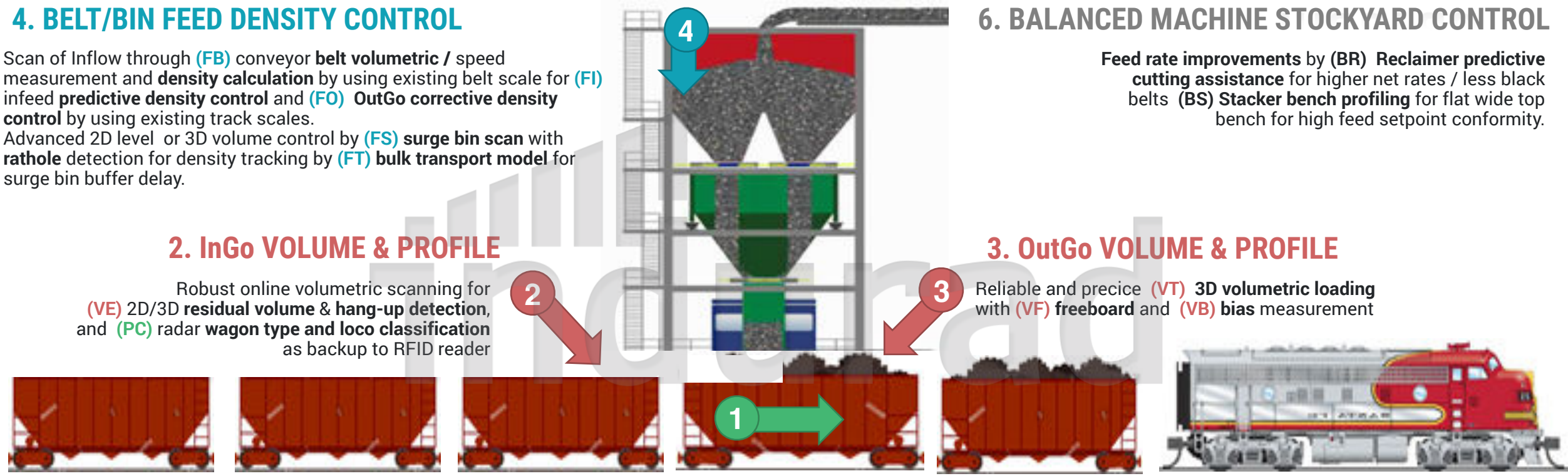
Considering a systems approach with radar machine vision

4. BELT/BIN FEED DENSITY CONTROL

Scan of Inflow through (FB) conveyor **belt volumetric /** speed measurement and **density calculation** by using existing belt scale for (FI) infeed **predictive density control** and (FO) **OutGo corrective density control** by using existing track scales.
Advanced 2D level or 3D volume control by (FS) **surge bin scan** with **rathole** detection for density tracking by (FT) **bulk transport model** for surge bin buffer delay.

6. BALANCED MACHINE STOCKYARD CONTROL

Feed rate improvements by **(BR) Reclaimer predictive cutting assistance** for higher net rates / less black belts **(BS) Stacker bench profiling** for flat wide top bench for high feed setpoint conformity.



2. InGo VOLUME & PROFILE

Robust online volumetric scanning for (VE) 2D/3D **residual volume** & **hang-up detection**, and (PC) radar **wagon type and loco classification** as backup to RFID reader

3. OutGo VOLUME & PROFILE

Reliable and precice (VT) **3D volumetric loading** with (VF) **freeboard** and (VB) **bias** measurement

0. SUPERVISION

Full graphical **digital twin** for the control room by **(SO)** operational **SCADA 3D visualization** via HDMI and virtual CCTV stream and by **(SM) maintenance** via web browser **in HTML**

1: POSITION, IDENT, MONITOR

Low latency and **millimeter accurate** (PL) **radar absolute wagon positioning** and (PS) **speed measurement** and **PE-Cell replacement radar** by (PG) gap localization and InGo (PC) **radar wagon & loco classification** Optional (PO) **camera based OCR** for Rail Car ID, (PB) Bulk high speed flow and level control at chute, (PD) open door detection and (PT) spillage monitoring in pit or on track

5. INTEGRATION

Radar Machine Vision processing and **network** integration with field **(IF) junction boxes**, **(IP) field panels** and **(IS) substation** equipment including **processing units, PLC interface** and **(IR) iRemote VPN** configuration/support.