



Evolution of RFID in Manufacturing

RAIN Alliance Members Meeting – Feb 5, 2020

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MARKET PRESSURES FOR MANUFACTURERS

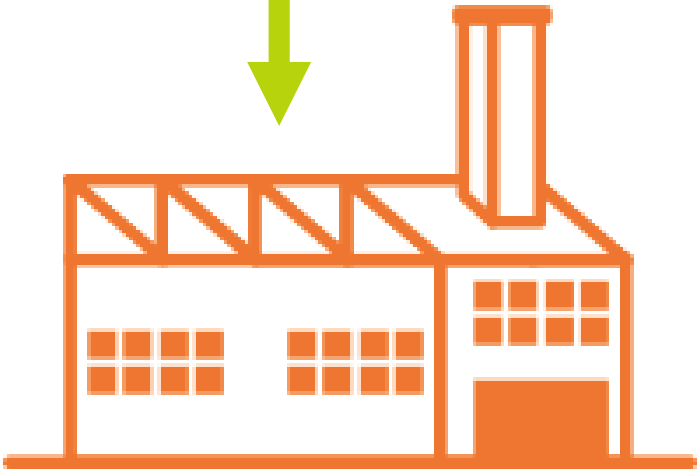
Individually Configured Products



Faster Time to Market



Reduce Costs



Improve Traceability



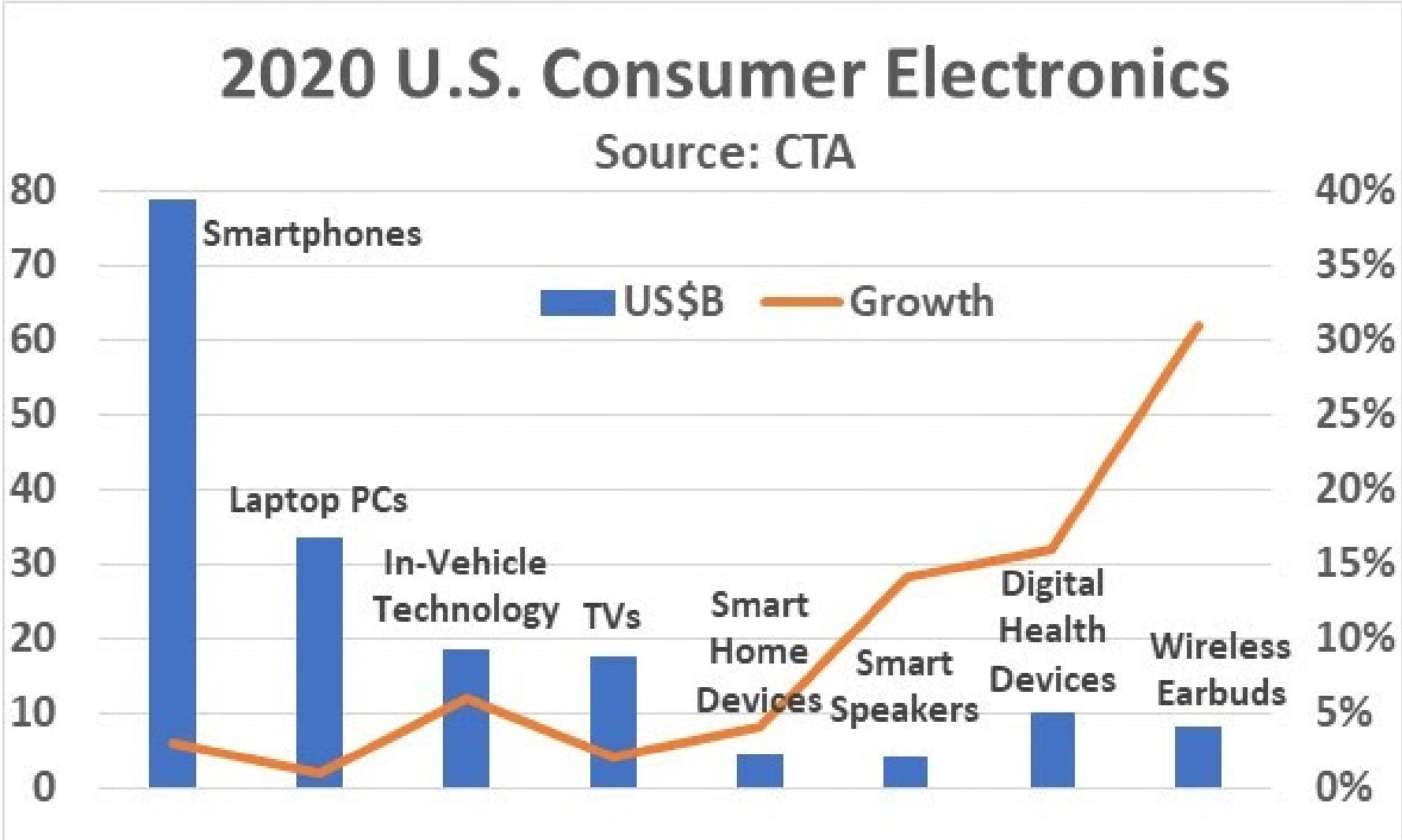
Improve Safety



JIT / JIS



SMART DEVICES ARE MAINSTREAM



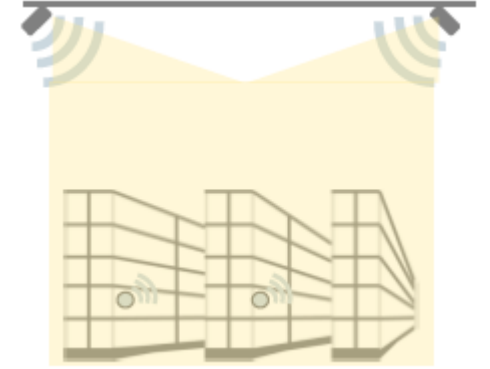
TECHNOLOGY EXPECTATIONS ARE CHANGING



Fixed



Mobile



Ubiquitous



BEYOND IOT – INTERNET OF EVERYTHING



RAIN IN MANUFACTURING



Automotive

Aviation



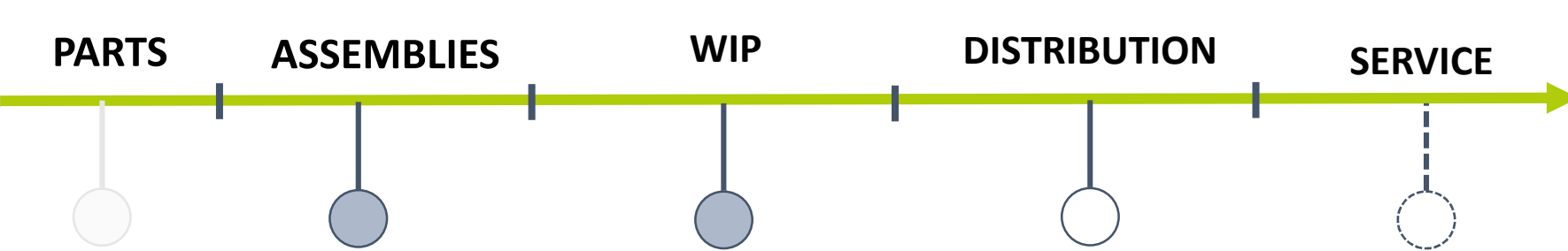
Electronics

Raw Materials



AUTOMOTIVE

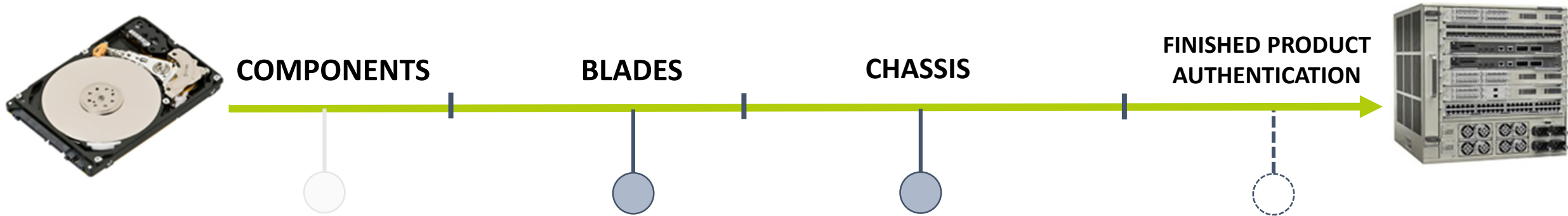
Full Chain with RAIN



<i>Smart Manufacturing and Logistics for automotive industry</i>	Product authentication	Tool Tracking	Automated logistics, Shipping verification	Warranty Data
	Container Tracking	KANBAN	Truck & Train identification	Spare parts authentication
	Machine MRO	Just-in-time & Just-in-sequence	Quality control	
	Component tracking	RTLS / Monitoring	Lean manufacturing	

ELECTRONICS

Full Chain with RAIN



*Smart Manufacturing
and Logistics for
Electronics OEMs:*

WIP monitoring

Critical tool identification

Automated logistics,
Shipping verification

Lean manufacturing

Quality control

*Smart Manufacturing
and Logistics for IT
industry SUPPLIERS:*

Component tracking

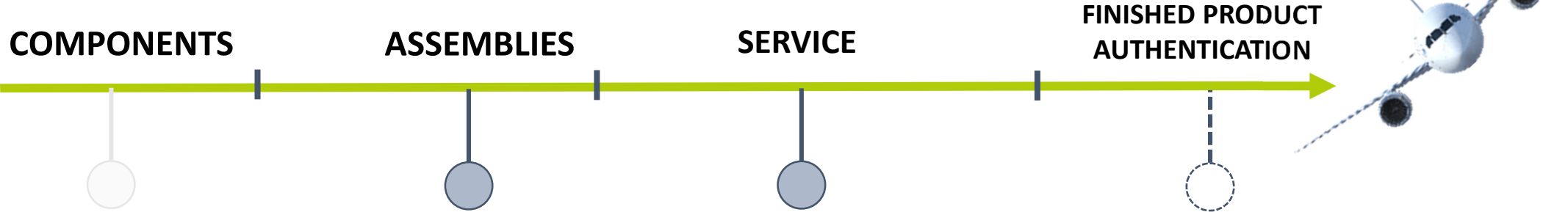
Product authentication

Audit Compliance

MRO

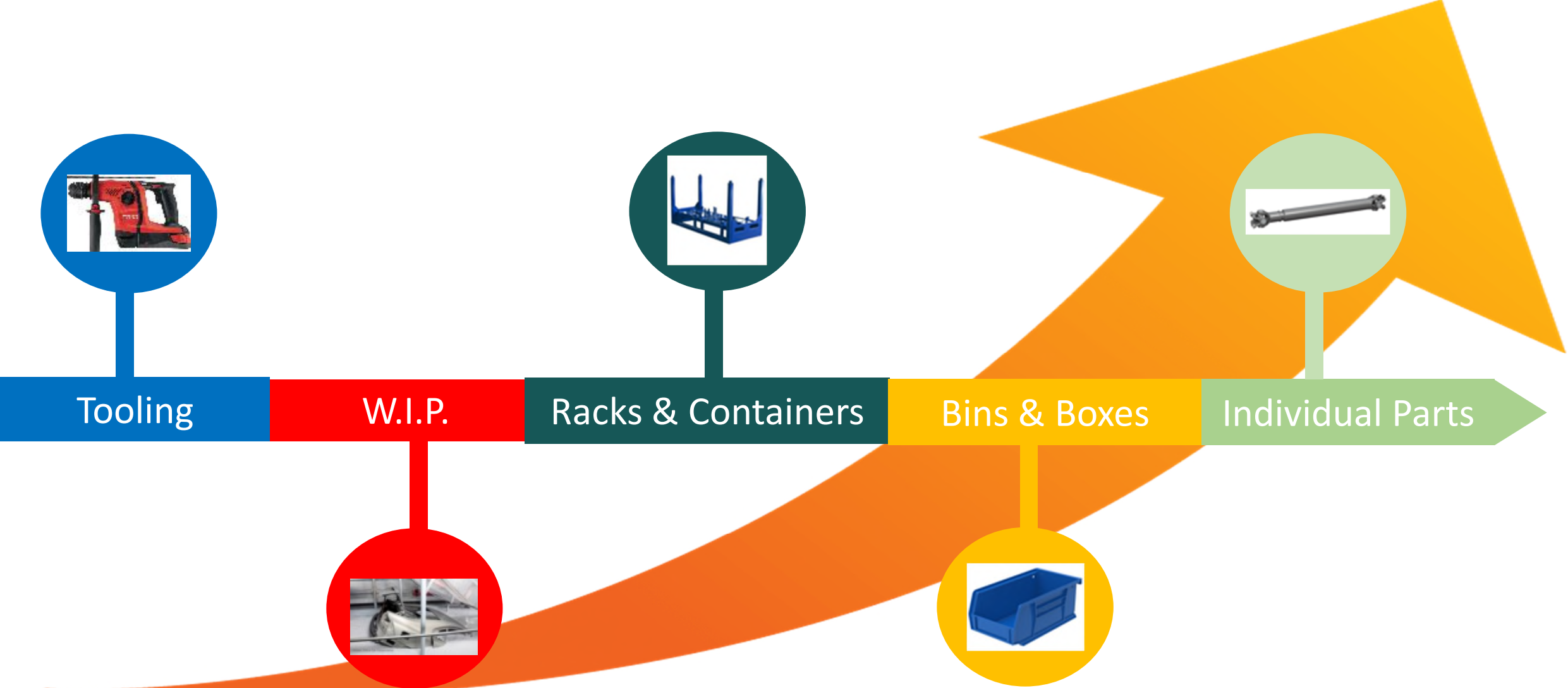
AVIATION

Full Chain with RAIN



<i>Smart Manufacturing and Logistics for Aviation OEMs:</i>		Lean manufacturing	Critical tool identification	Automated logistics, Shipping verification
	WIP monitoring		Quality control	MRO
<i>Smart Manufacturing and Logistics for Aviation industry SUPPLIERS:</i>	Component tracking		Just-in-time & Just-in-sequence	Audit Compliance
	Kit Verification	Product authentication		

GROWTH OF RAIN WITHIN MANUFACTURING



VOLVO LEAN OPERATIONS

WIP MONITORING



Robust passive UHF RFID tag capable of withstanding the harsh conditions of car manufacturing.

Now Volvo Cars is able to track the car bodies all the way from the welding and paint shop to the point of final assembly.



Challenge

- Control complex product mix
- Manage customized cars through full assembly
- Improve reliability

Benefits

- Real-time production monitoring
- All car body related data available
- Process yields > 99.96%

OFF-ROAD VEHICLE MANUFACTURING WIP MONITORING

Ultra-rugged RAIN RFID encapsulated tag for identifying AGVs.

AGVs are associated with vehicle frames and workers are notified at the end of the assembly line if a production step was missed.



Challenge

- Production line accuracy
- Growing demand = production increases

Benefits

- Increased vision inspection accuracy by 30%
- Eliminate manual production identification process, saving over \$200,000 per year
- Decrease inventory management equipment costs by over 40%

ENGINE MANUFACTURING WIP MONITORING

Rugged RAIN RFID encapsulated tag for tracking metal pallets which hold engines during the manufacturing process.



Challenge

- Lack of visibility into part-to-pallet association and floor location
- 500+ hours of wasted labor spent annually inspecting pallets for potential quality issues.
- Costly recalls due to pallets being shipped with parts that did not meet quality standards.

Benefits

- Eliminated the need for a forklift driver to manually inspect each pallet.
- Visibility to which pallets contain specific parts so pallets can be located as needed.

HONDA ENGINE LOGISTICS

SHIPMENT ACCURACY



HONDA

Industrial grade, durable RAIN RFID tag for metal racks which transport Honda Engines.

Enables tracking of outgoing engine shipments to ensure outbound products are loaded onto the correct trucks.



Challenge

- Errors in shipping products to the wrong location by loading onto the incorrect truck.
- Manual reading or barcode scanning required operators to dismount the forklift

Benefits

- Immediate feedback to forklift operators that the engines are loaded onto the correct trucks
- Higher safety with operators remaining on forklifts
- Reduced labor costs

METAL PRODUCT LOGISTICS

STEEL COIL INVENTORY MANAGEMENT

RAIN RFID tag for identifying metal materials. Identification can be safely achieved without dismounting vehicles.

Manufacturer relies on the RAIN Tag to be able to identify their products quickly and efficiently.



Challenge

- Tracking and managing millions of steel coils and bars coming from multiple suppliers. Manual or barcode based tracking resulted errors, high resource consumption, and risk of injury

Benefits

- Automatic tracking reduces errors and brings accurate data of the assets
- Positively identify assets from the safety of the fork truck
- Increase of warehouse management efficiency, time and resources saving
- Automated feedback when loading onto vehicles for distribution

SMART KANBAN

INTELLIGENT PARTS REPLINISHMENT

RAIN RFID
KANBAN cards for
use with
intelligent
KANBAN systems.

Intelligent
KANBAN
fulfillment for a
wide variety of
vehicle
components.



Challenge

- Production delays due to inefficient KANBAN
- Manual ordering of replenishment parts
- Large inventory
- Challenge with RFID on ESD KANBAN bins

Benefits

- Reduce inventory
- Efficiently deliver smaller batches
- Automate replenishment orders

DANA LEAN OPERATIONS

WIP MONITORING



Custom-built RAIN RFID tag capable of withstanding the harsh washing, painting, and manufacturing process.

Ability to track the parts through production with 100% traceability at each work station.



Challenge

- Operator handling of parts
- Parts are shipped off-site to 3rd party
- Washing and painting process

Benefits

- 100% traceability through production (including off-site painting)
- MES integration for real-time updates
- Reduced labor costs

MATERIALS TRACKING

RTLS OF RAW MATERIALS

3D RAIN label capable of accurate reads in any orientation.

Ability to track the materials down to bin level location in large manufacturing facility.



Challenge

- Tracking raw materials to bin level
- Large facilities (1M+ sq ft)
- Gantry cranes limit low ceiling mount

Benefits

- X,Y, Z axis accuracy for 3D positioning
- Integration to PLC systems for automated events based on items location
- Eliminates “searching” for materials



Thank you!

