



MED Ports 2017 exhibition

Meeting the customer needs of today and tomorrow with Terminal Tractors

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One in four container movements around the globe is handled by a **Kalmar solution.**

We serve different industries



Over 100,000
forklifts built



Market leading
supplier of
reachstackers



Global market
leader in Terminal
Tractors



Innovative
K-Motion
technology



World's
heaviest lifter



Largest range of
empty container
handlers



**Number of lessons from
cross industry
perspective and from
cross product experience**

Two current topics for Terminal Tractors

Driverless Terminal Tractors

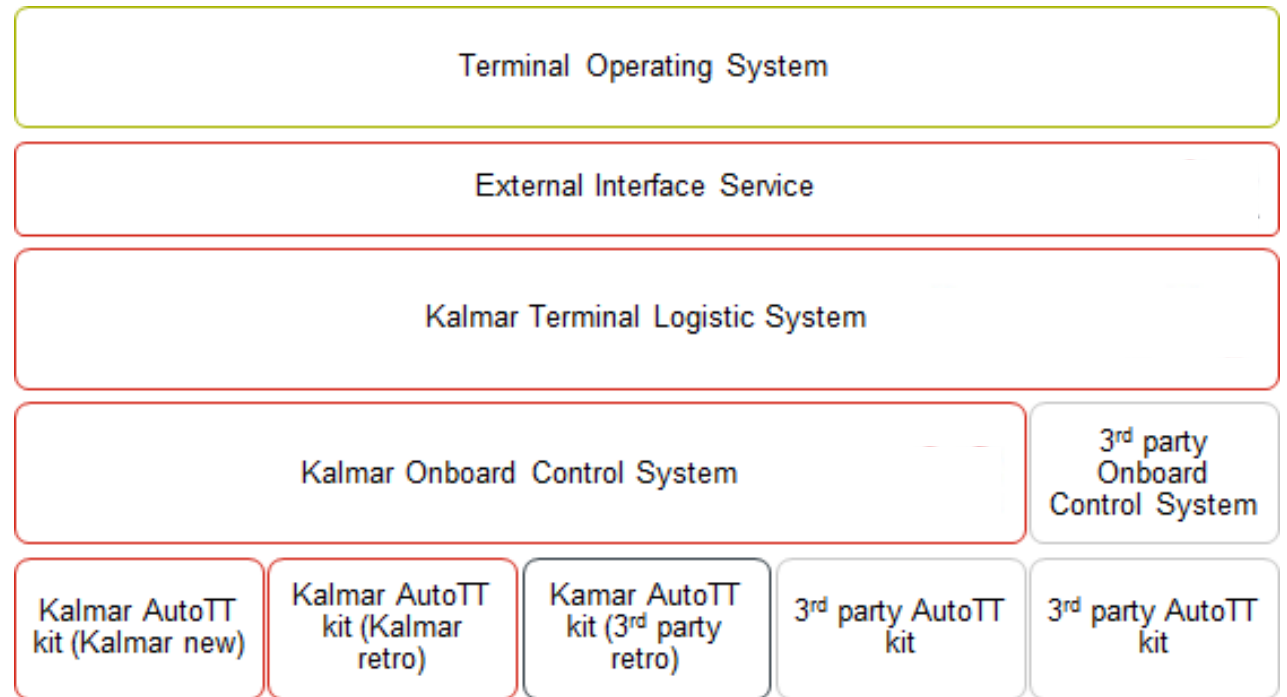
Zero emission Terminal Tractors



Driverless Terminal Tractor

Functional layers

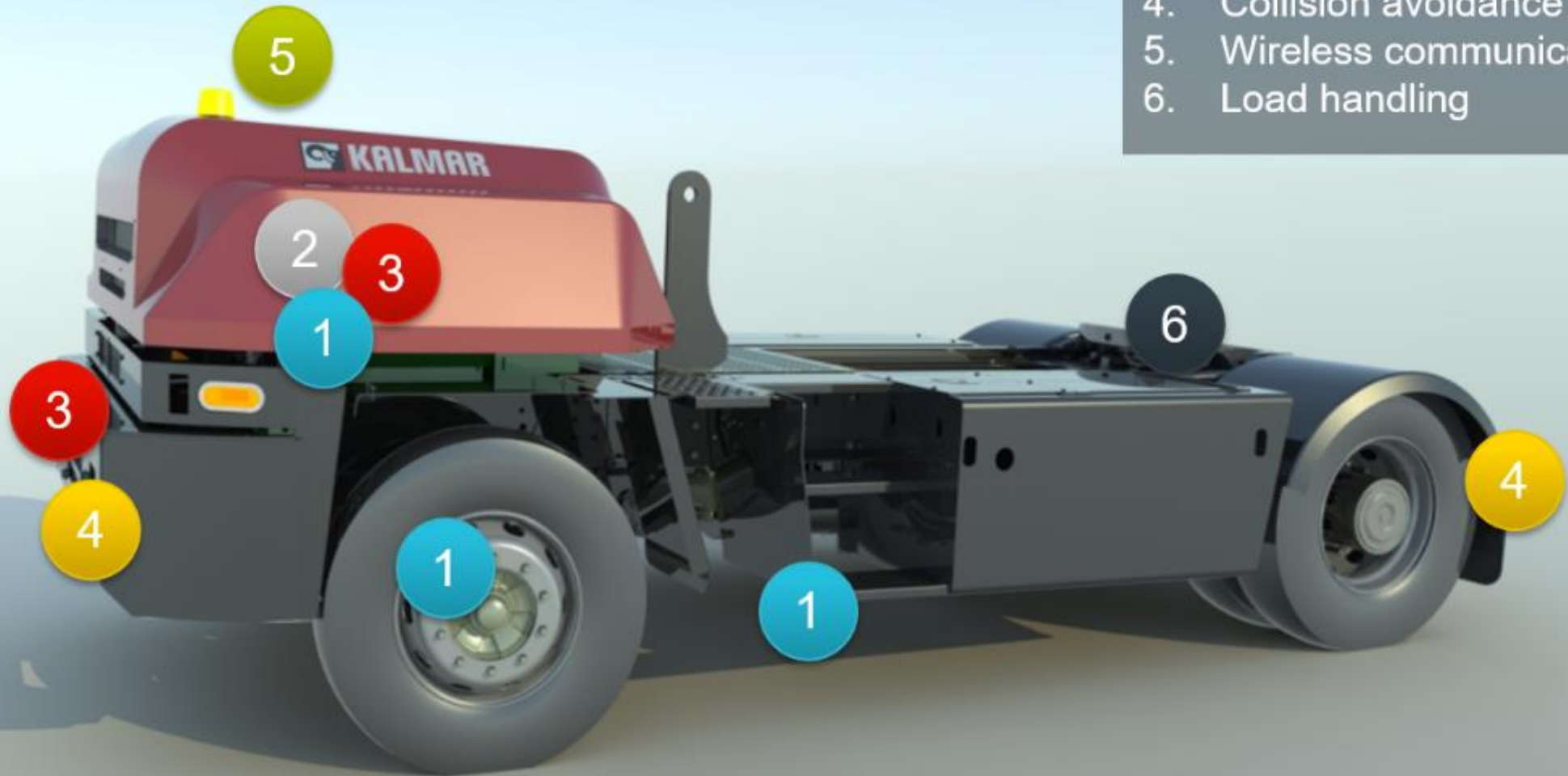
- Modular and proven platform
- Retrofitting possible to both Kalmar and 3rd party terminal tractors
- Supports mixing of multiple vendor AutoTTs and / or other automated CHEs
- Easy to integrate
- Open interfaces through Kalmar Key



Driverless Terminal Tractor

ONBOARD SYSTEMS

1. Positioning
2. Machine Control
3. Safety
4. Collision avoidance
5. Wireless communication
6. Load handling



Two current topics for Terminal Tractors

Driverless Terminal Tractors

Zero emission Terminal Tractors



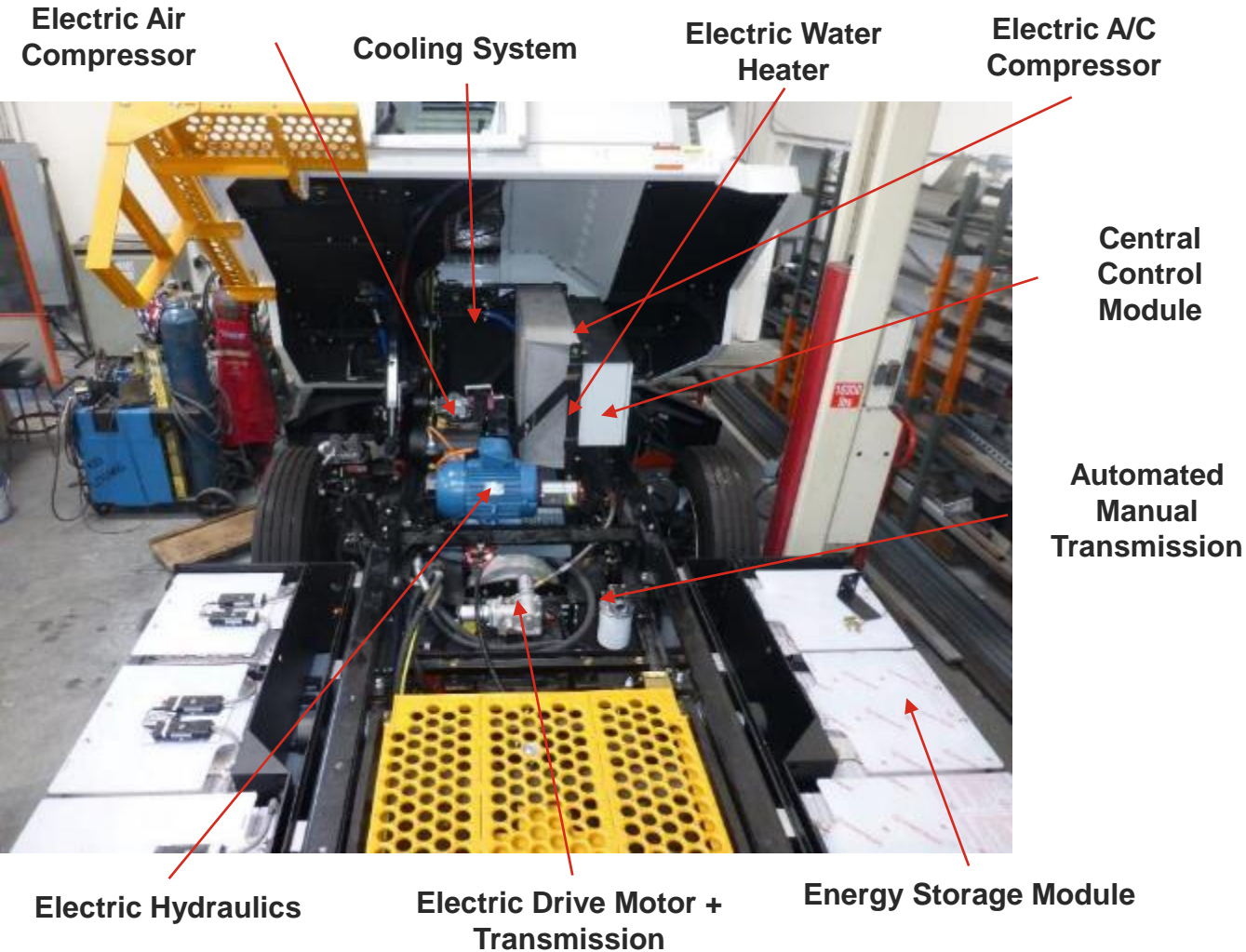
Electric Terminal Tractor

Kalmar way of zero emissions

Learnings from the distribution industry



Electric Terminal Tractor



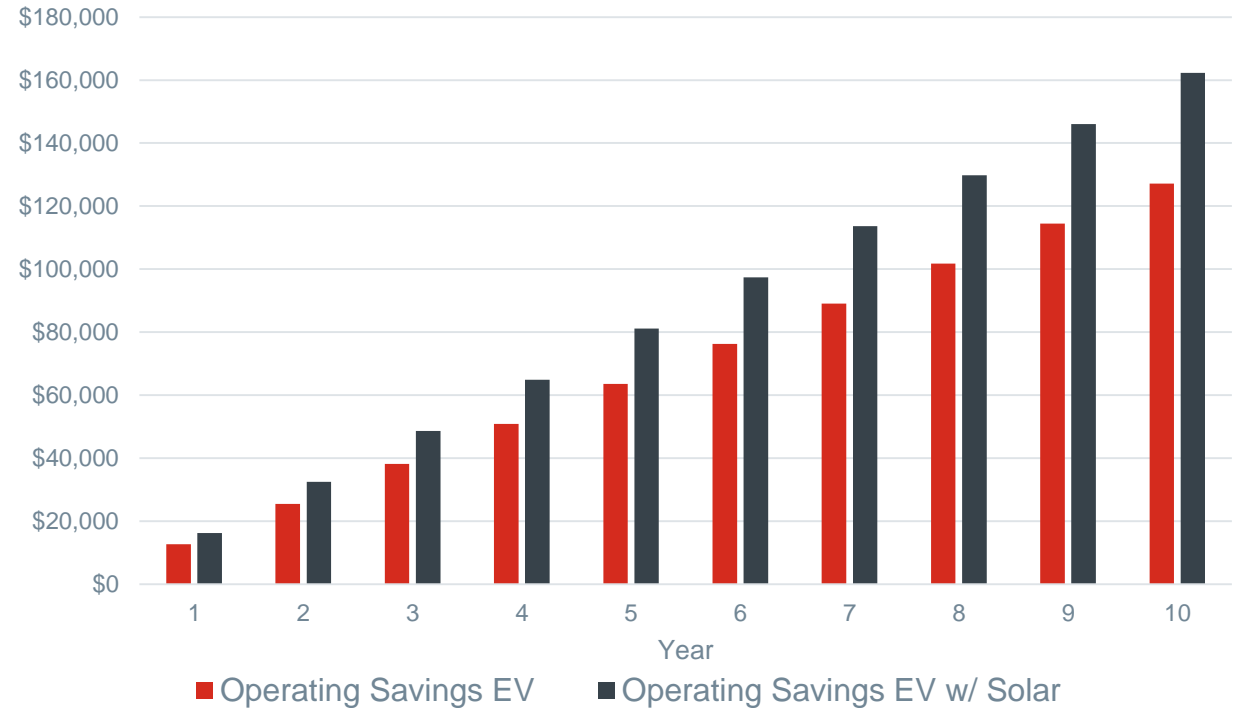
Zero emissions is also about TCO

	EV	Diesel	Savings
Total Miles	13435	13435	
Average kWh/mi (Wall)	2.0	9.7	
Hours / Year	3283	3283	
Average kWh/hr	9.9	48.7	
Energy (kWh) Consumed	65,010	316,298	215,288
Maintenance	\$6800	\$13000	\$6200
Cost w/o Solar	\$10,700.59	\$23,418.24	\$12,717.65
Cost w/ 90% Solar	\$7,190.06	\$23,418.24	\$16,228.18

NOTES

3 shifts/day, 5 days / week, used for base comparison
 Electricity Costs \$0.12 / kWh
 Diesel costs: \$2.50 / gal, \$0.07 / kWh

Cumulative Operating Savings



NOTES

3283 hr / year, \$.12/kWh and \$2.50/gal = \$127,000 – \$162,000 over 10 years
 Reduction in diesel prices reduces payback, increased tractor usage increased payback

