

My Story

A Story of Transforming to Lean Product and Process Development

Geoff Neiley, Director CPI and CM, 8/8/24

CARGO SCANNING & SOLUTIONS

RAPISCAN SYSTEMS | AS&E — PART OF THE OSI SYSTEMS FAMILY OF SECURITY COMPANIES



Broad Product Offering

Portal



Eagle P60



Eagle P60 ZBx



Z Portal for Trucks



Z Portal for Cars



Sentry Portal



Sentry + Z Portal



Eagle P25



CarView

Gantry



Eagle G60



OmniView Gantry



OmniView ZBx



Eagle C25

Mobile



Eagle M60



Eagle M60 ZBx



Eagle M25



ZBV Line

Trailer



Eagle T60



Eagle T25

Rail



Eagle R60



Eagle R90

Air Cargo



Eagle A25

Handheld

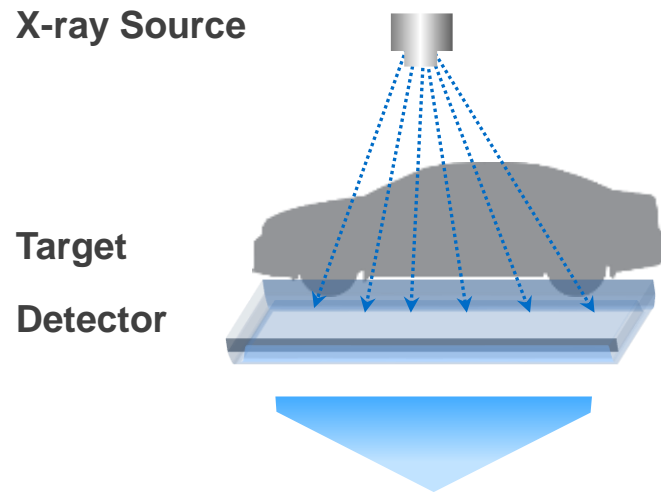


MINI Z

Complementary Detection Technology: Transmission X-rays and Z Backscatter X-rays

Transmission Tx

X-rays detect by passing an X-ray beam through a target to a detector on the far side.

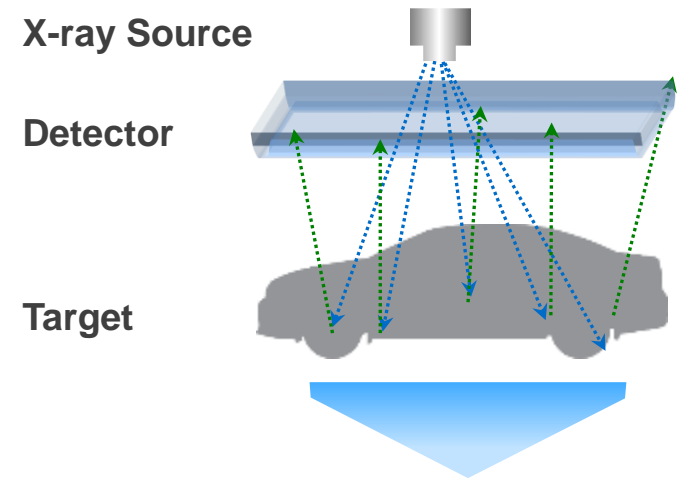


The transmission image reveals an artillery shell in the trunk of the vehicle

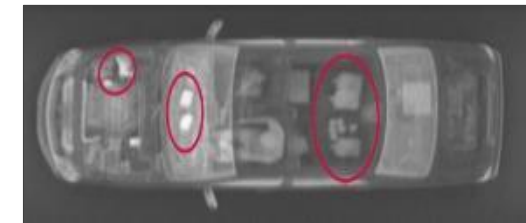


Z Backscatter Bx

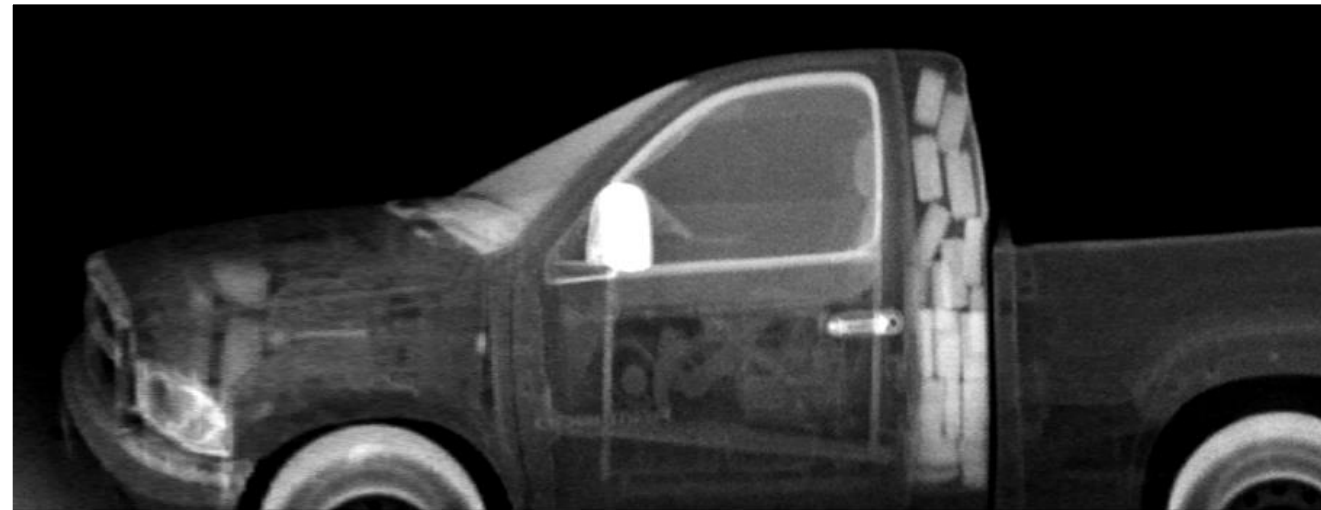
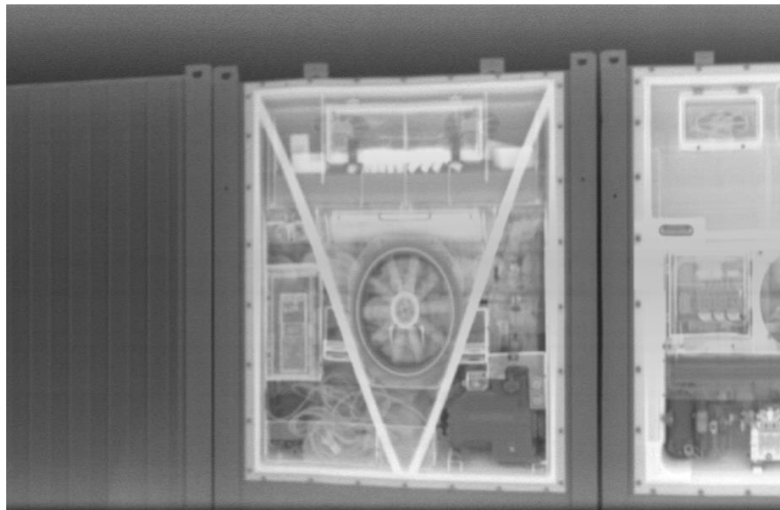
X-rays detect by reflecting an X-ray beam from a target to a detector on the near side, creating a photo-like image that is easy to interpret.



The Z Backscatter image of the same vehicle reveals hidden drugs and currency



ZBV Bx Images



My Story

Out of darkness...

Into the light...



Delays

Re-dos

Guessing

Frustration

Despair

Speed

Execution

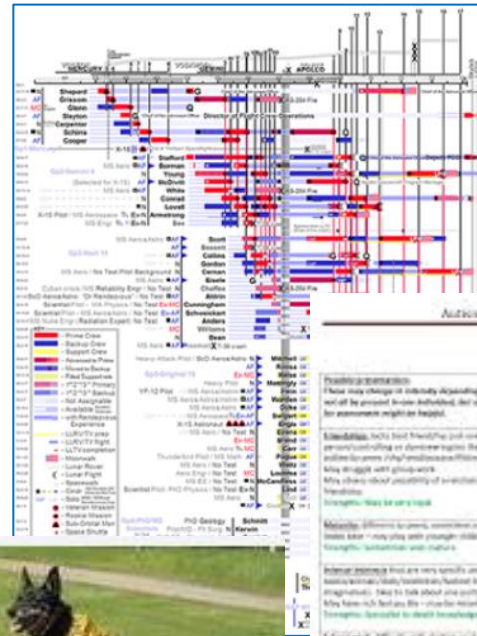
Confidence

Excitement

Enthusiasm

Darkness

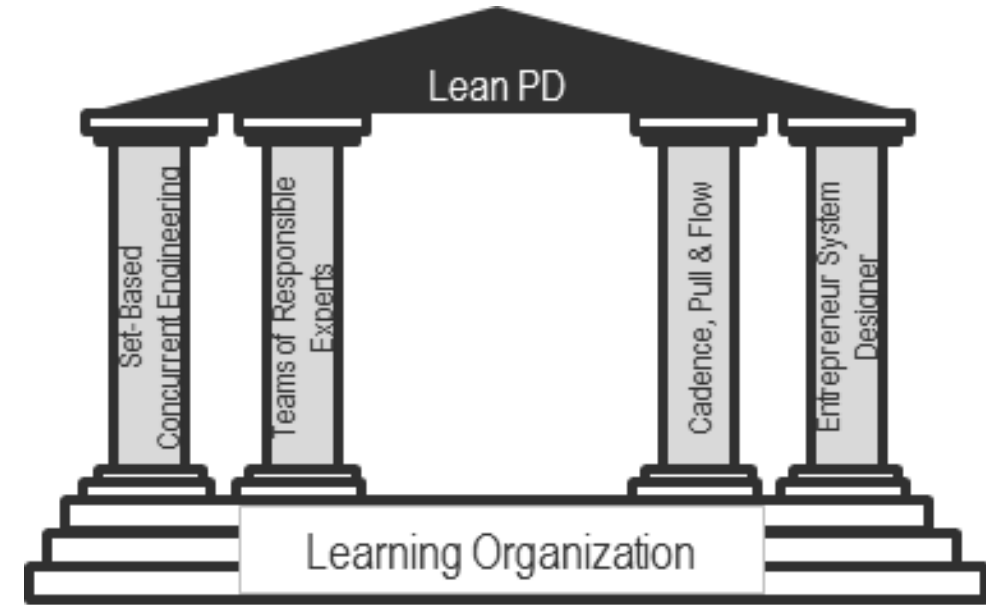
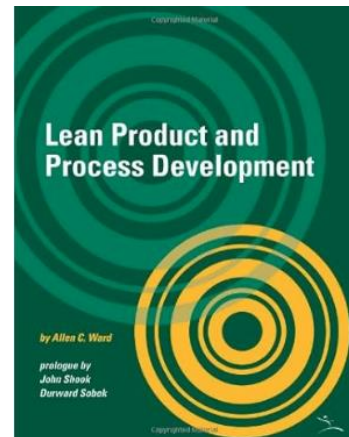
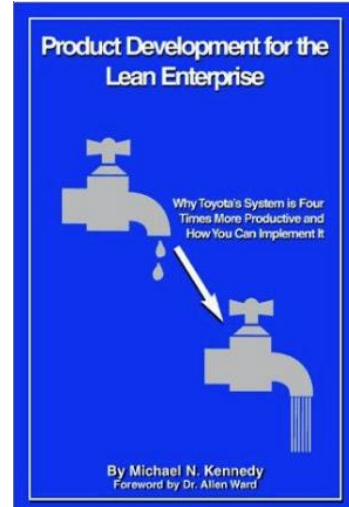
- Requirement shifting
- Massive Gantt charts
- Endless planning
- Dog and Pony shows
- Encyclopedic check-lists
- Siloed departments
- Endless delays



A screenshot of a document titled "Notice to Work Change". The text is dense and appears to be a formal notice or contract. The document is partially obscured by other elements in the slide.



- New VP Engineering
- Executive sponsorship
- LPPDE NA 2014
- In-house training
- Required reading
- Foundational principles

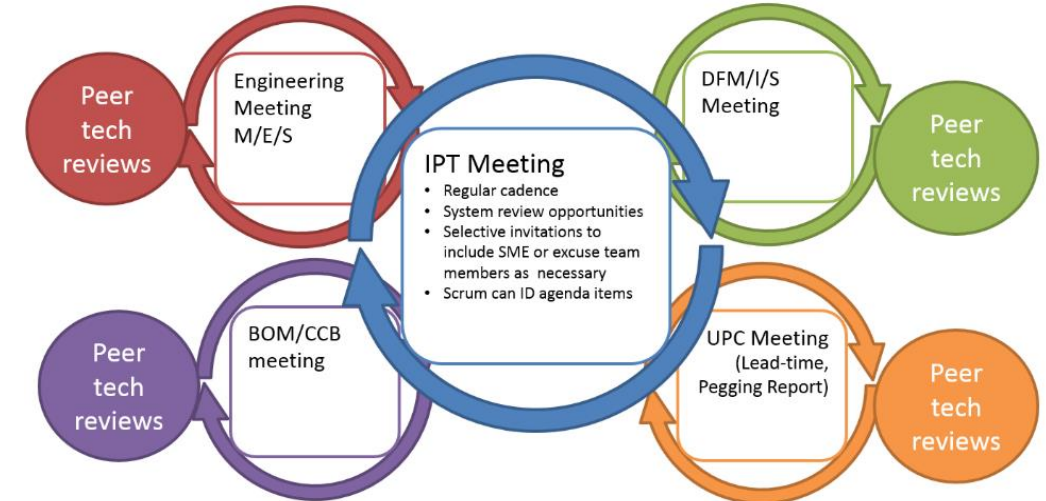
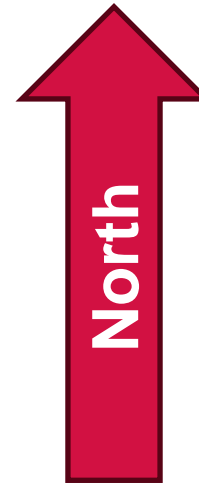


Lean Product and Process Principles

- Cadence, Pull and Flow
- Entrepreneurial System Designer
- Teams of Responsible Experts
- Set Based Innovation

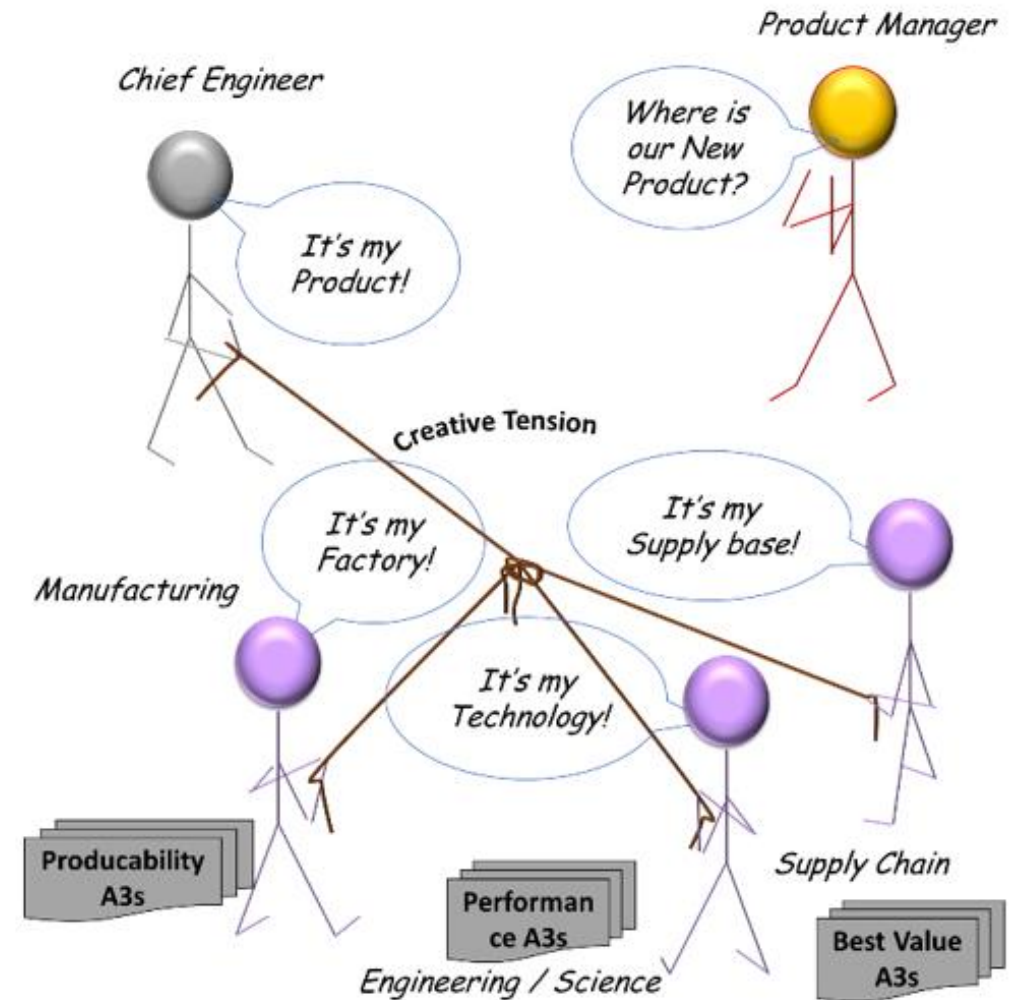
Cadence Pull and Flow

- Regular meetings occurrences
- Check-in
- Communication
- Direction
- Team building and support
- Common goal



Entrepreneurial System Designer (Chief Engineer)

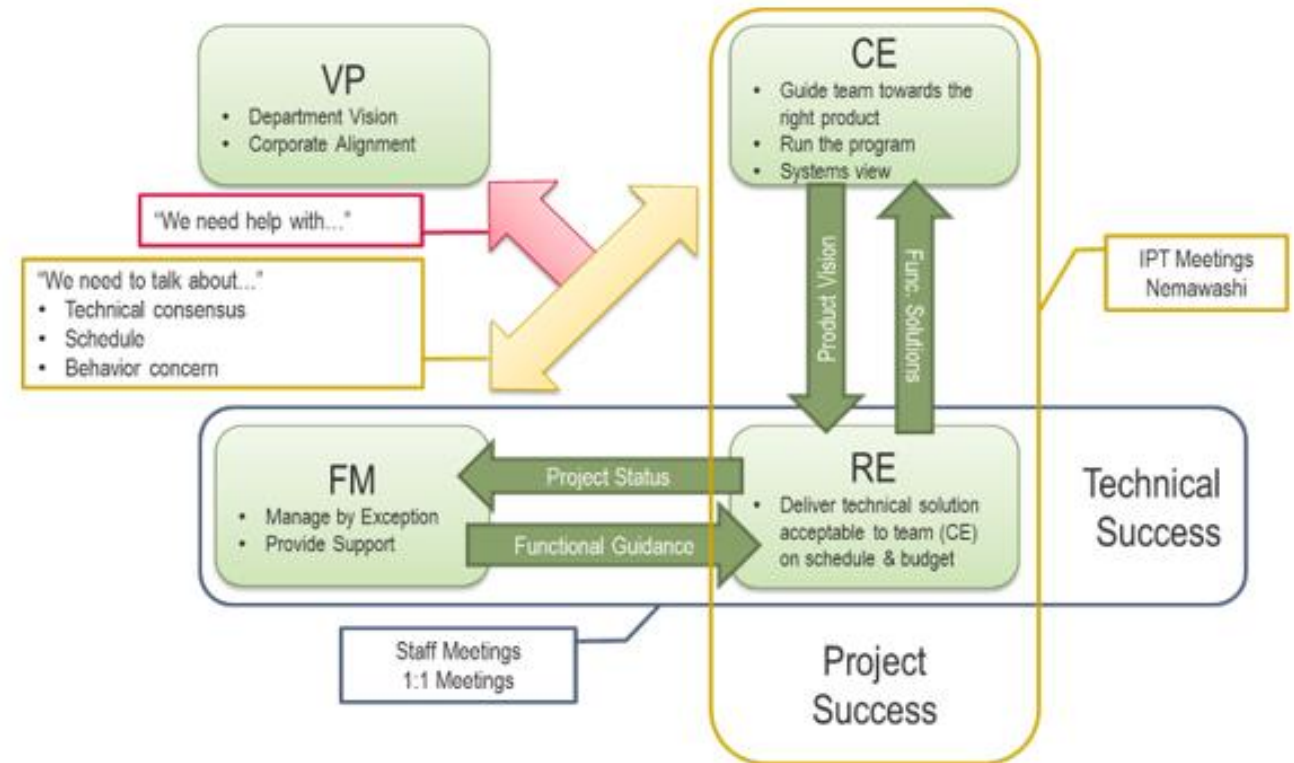
- Responsible to the success of the product.
- Has a Product Manager counterpart
- Builds a cross-functional team (across engineering and the whole organization)
- Provides guidance and direction
- Removes roadblocks



Into the Light

Teams of Responsible Experts

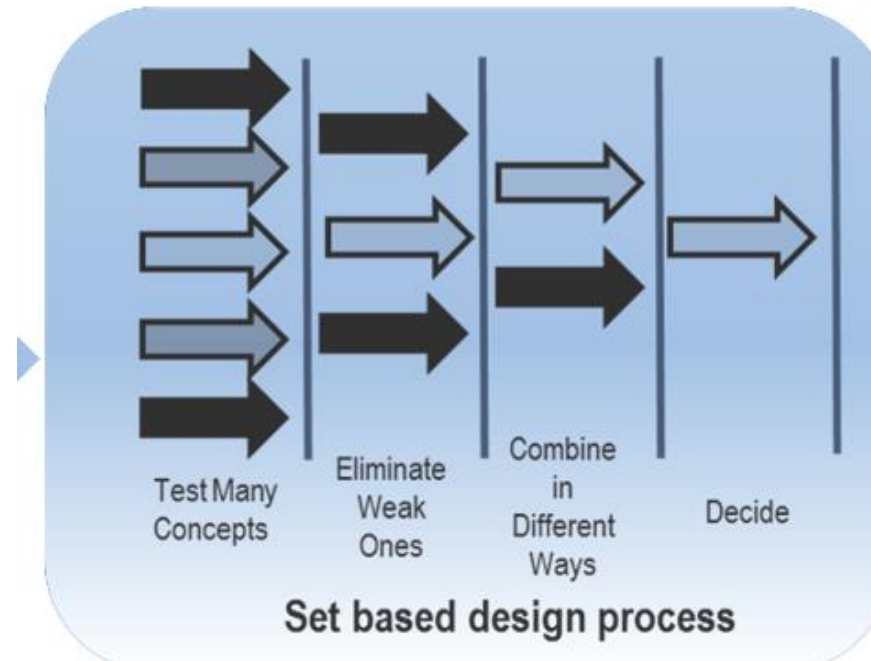
- We trust you
- Work directly with the chief for direction and technical support
- See your functional manager for administrative support



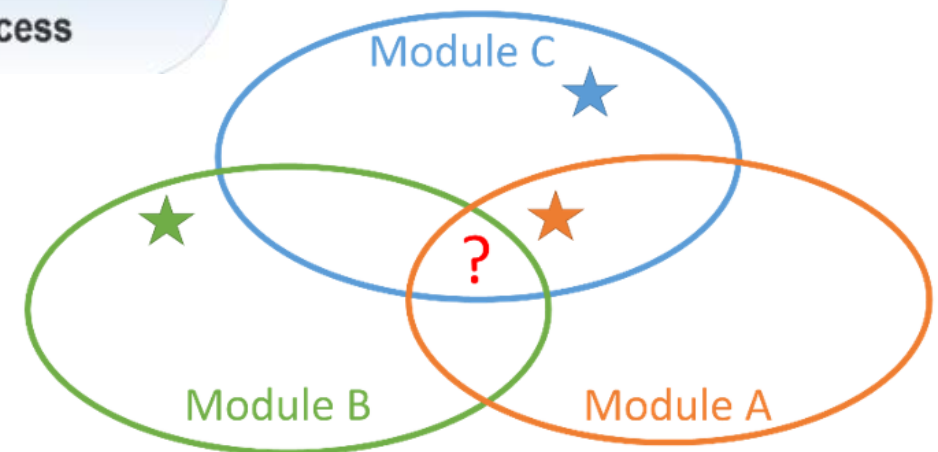
Into the Light

Set-Based Innovation

- Test many options
- Test early
- Test to failure
- **Document knowledge**
- Down select on data
- Success Assured



The best of each may not be the best overall:



Into the Light

Story of success

- Tx View
- Ramp selection
- Ramp is still successful, today.



Ground Detector Survival

	Imaging Spec GVW 30,000 (LB)	US Spec GVW 80,000 (LB)	US Spec Axle MAX 20,000 (LB)	EU Spec GVW 101,412 (LB)	EU Spec Axle MAX 25,350 (LB)
Spine Bending, Ground Plane	<1% Image Variance	Detector/Trailer Survive*	N/A	Detector/Trailer Survive*	N/A
Spine Bending, Beam Plane	See Road Rut Spec	N/A	See Road Rut Spec	N/A	See Road Rut Spec
Check Ground Motion, With Trailer	<1% Image Variance	May need coast*	N/A	May need coast*	N/A
Check Ground Motion, Without Trailer	<1% Image Variance	See Alignment Clutch	N/A	See Alignment Clutch	N/A
Check Ground Motion, With ZBV	<1% Image Variance	N/A	N/A	N/A	N/A
Check Ground Motion, Without ZBV	<1% Image Variance	See Alignment Clutch	N/A	See Alignment Clutch	N/A
COTS Ramp / Lid	Rated (per foot)	N/A	Rated (per foot)	N/A	Rated (per foot)
Modified Ramp / Lid	780 (Phase 1 Test)	N/A	780 (Phase 1 Test)	N/A	780 (Phase 1 Test)
Alignment Clutch	<1% Image Variance	May need coast*	N/A	May need coast*	N/A

* Due to high combinations of GVW, Incline (up to 2°), & snow or ice road cover.

Spec: max vehicle weight = 30,000lb (TBD) Imaging
 Spec: max vehicle weight = 80,000 & 101,500lb Ramp / Detector Survival
 Road Condition Spec: max incline (α) = 2°
 Road Condition Spec: Ice / Snow
 $F_R = mg \sin \alpha$

QIGM25-A4A - SPECIFICATIONS

LIMIT CAPACITY
 Max. Weight: 10,000 lbs
 Max. Length: 100 ft
 Max. Width: 10 ft
 Max. Height: 10 ft

Assumes:
 uphill travel & no acceleration
 Excludes:
 downhill travel & braking
 (which tested much better in Phase 1, probably due to combined trailer braking)

Ramp Performance Will Be Characterized Two Ways:

Maintain imaging performance of light vehicles

NON-positive traction Axle shown

Ensure detector survival with heavy vehicles

NON-positive traction Axle shown

1. ZBV chock (70 to 800 LB Reaction)
2. Adjusting joint position
3. Trailer chock (250 to 975 LB Reaction)

Assumes:
 Continuous stiffness across spine & chock joints
 NOTE: conservative approach to bending analysis
 Excludes:
 Dynamic affects of traction loss

M. Chesna 03/27/15

Prototype tested in Phase 1 (Design04200)

A36 bent sheet (65 LB)
 Stiffness (EI) = 1.98 (10⁶)
 Section Cgy = .202" Cmax = -.675"

Proposed design in Phase 2 (Design04863)

6 series AL weldment (28 LB)
 Stiffness (EI) = 1.46 (10⁶)
 Section Cgy = .226" Cmax = -.712"

BEAMS WITH UNIFORM SECTIONS AND UNIFORM LOAD

The natural frequency is defined as $\omega_n = \sqrt{\frac{EI}{\mu L^3}}$ where μ - mass per unit length of beam
 Δ is given below for common configurations

	MODE 1	MODE 2	MODE 3
Free-Free	22.4	61.7	121.0

Max Horizontal Deflection (Under its own weight)

1.95"

Mode 1: 1.85Hz
 Mode 2: 5.05Hz

Horizontal Max Deflection (Under its own weight)

1.62"

Mode 1: 2.00Hz
 Mode 2: 5.50Hz

Max Dynamic Bending (30,000 GVW / 2° grade / ice)

.485"
 $\sigma_{cmax} = 26,283(\text{psi})$

Actual measured in phase 1; ~2.25"

- ~2° grade
- Definitely ice
- Definitely > 30,000 GVW
- Multiple joints flexed

Max Dynamic Bending (30,000 GVW / 2° grade / ice)

.600"
 $\sigma_{cmax} = 9,700(\text{psi})$

Phase 1 Testing:

Hybrid Ramp
 3% grade
 Cold

Rut Profiles Specification

ALLOWABLE RUT DEPTH
 12 IN WIDE MAX RUT
 25 IN WIDE MAX RUT
 48 IN WIDE RUT

Remaining in the Light

- Not easy
- Forces pulling you back to the darkness
- New people
- New leaders
- Challenging demands
- Happens without intension



Transition tools



- **Start with the cadenced meeting. “Get to the gym”.**
- **Empowered teams. Trust inspires.**
- **Test, test, test (learn, learn, learn).**
- **Document and share your learning.**

Thank You!

UK Operations

Prospect Way, Victoria Business Park
Biddulph, Stoke-on-Trent ST8 7PL
United Kingdom

US Operations

829 Middlesex Turnpike
Billerica, MA 01821
USA

sales@as-e.com
sales@rapiscansystems.com
service@as-e.com

+1.978.262.8700 | 1.800.225.1608

www.rapiscan-ase.com
www.screeningsolution.com