

# Integrating Inspection & Monitoring Technologies Into Bridge Management Programs: A Proven Process

Presented April 11, 2018 by

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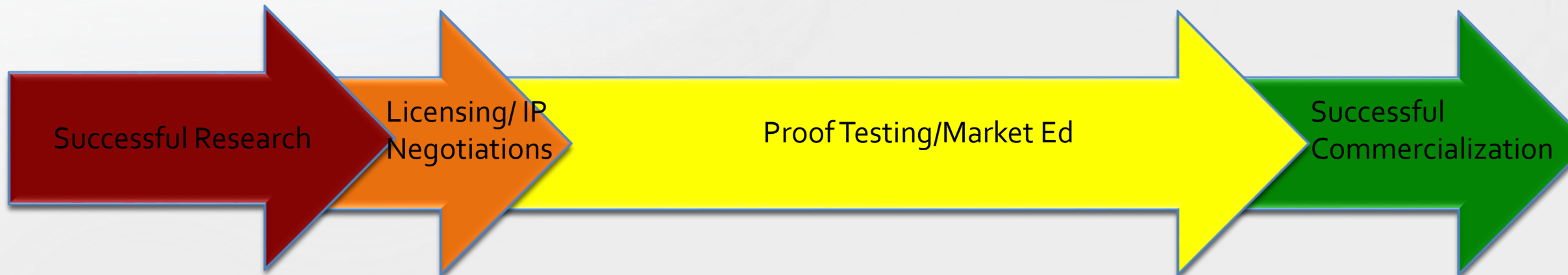
# Overview

- Proposed Process for Effective Technology Transfer/Integration for the Bridge Industry for subsequent usage in effective bridge decision making.
  - > Our Ten (not so) Easy Steps
- Case Study
- Conclusions

# Challenges

- Asset owners are always being asked to do more & act more quickly with inadequate funding
- Technology and innovation can help but...
- Wading through the myriad of technologies out there can be difficult
- And the traditional technology transfer process is long
- Technology innovators are not used to the long adoption and sales cycles and the relatively few customers

# Traditional Technology Transfer



**HOW DO WE SHORTEN THE YELLOW PHASE?**

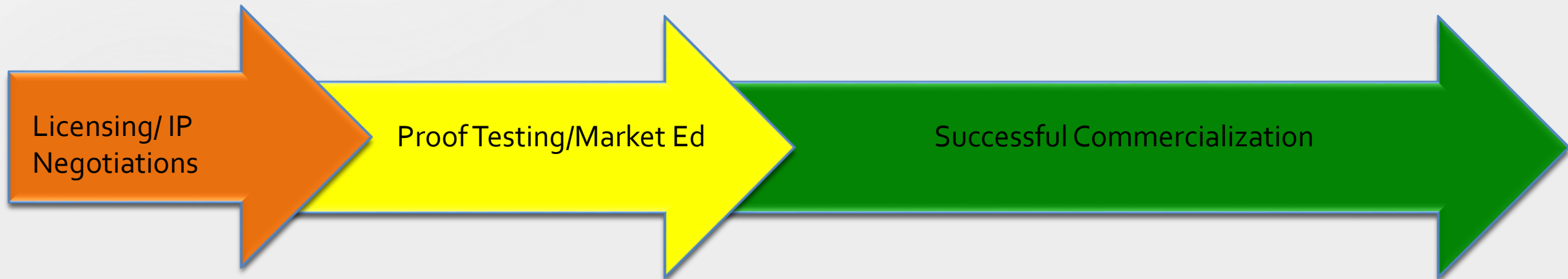
# Challenges for Traditional Tech Transfer, Unique to Surface Transportation

- Need for adopting cutting edge technology is urgent to address aging assets and personnel shortfalls (UAS, robotics, SHM)
- However, traditional conservatism, heavy reliance on specifications, and large inventory numbers present real challenges
- Also, processes vary from state to state
- In Short, Educating the Market and Proving Out Tech and Materials Takes A LONG TIME

# One Suggested Solution: Parallel Technology Transfer (PTT)

Taking already proven technologies from an “early adopter” industry and transferring it to the bridge industry

Shortens the yellow phase and may eliminate red research phase

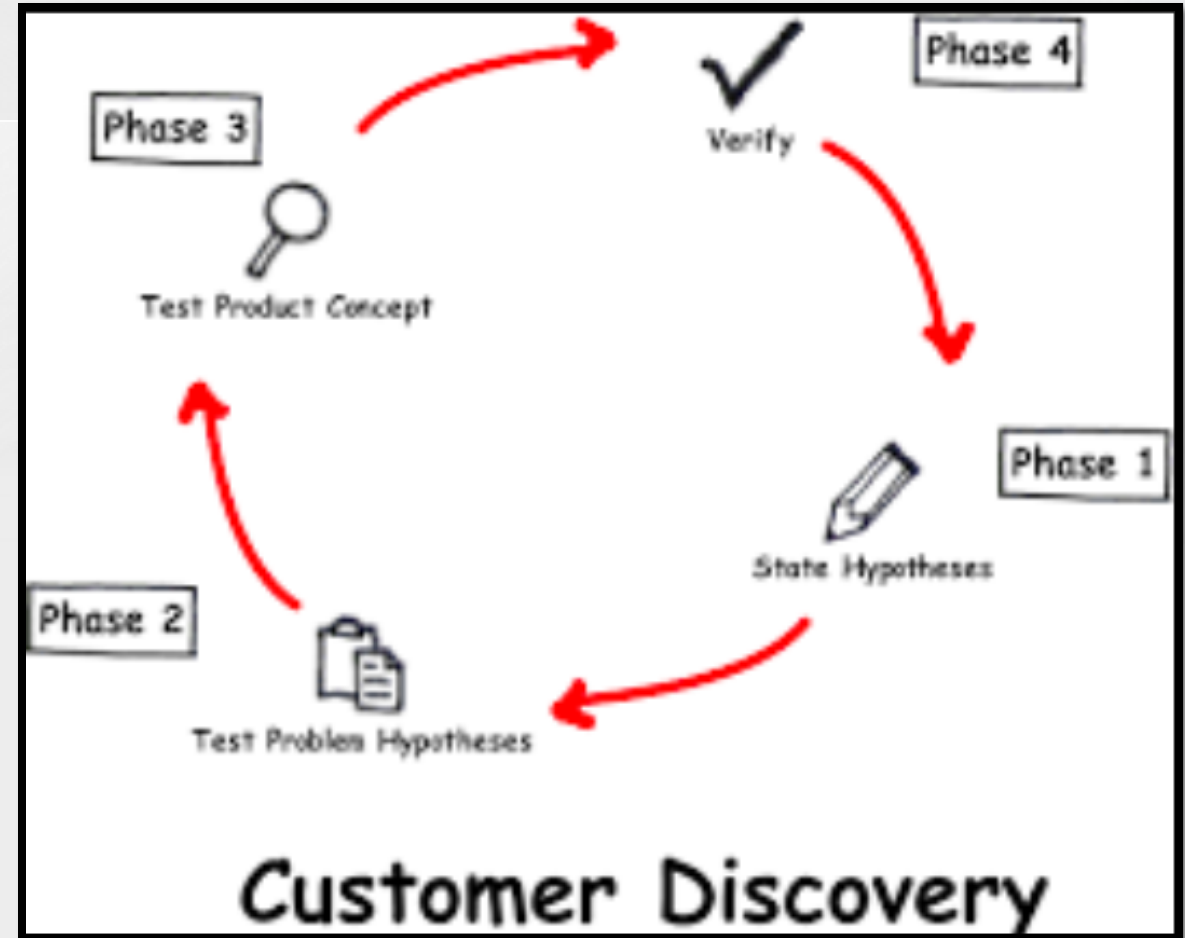


# Proposed Integration Process Overview Using PTT

1. Identify need
2. Identify solution in parallel industry
3. Expert vetting
4. Lead state and internal champion (mid-level) identification
5. Proof testing on material and situation –lab
6. Demo testing – field
7. Group proof testing – independent – Pooled funds
8. Knowledge transfer database (ABC database)
9. AASHTO support/specifications
10. Procurement options

# 1. Identify Need

- Various ways
  - Formal customer discovery
  - Field discovery
  - Specific ask – RFP, grant, or sole sourced
  - AASHTO subcommittees
  - NCHRP Research Needs Statements
- Is it a “need” or a “would be nice”?
- Market Analysis
- Competitive Analysis





## 2. Identify Solution in Parallel Industry

- Industries – Generally more profit driven or safety driven industries
  - Power Gen
  - Aerospace
  - Petrochem
  - Automotive
  - Construction
- Does the solution exist off the shelf?
- Can one be adapted?
- Will companies in other industries have the patience to stick with the bridge industry given the limited # of clients?

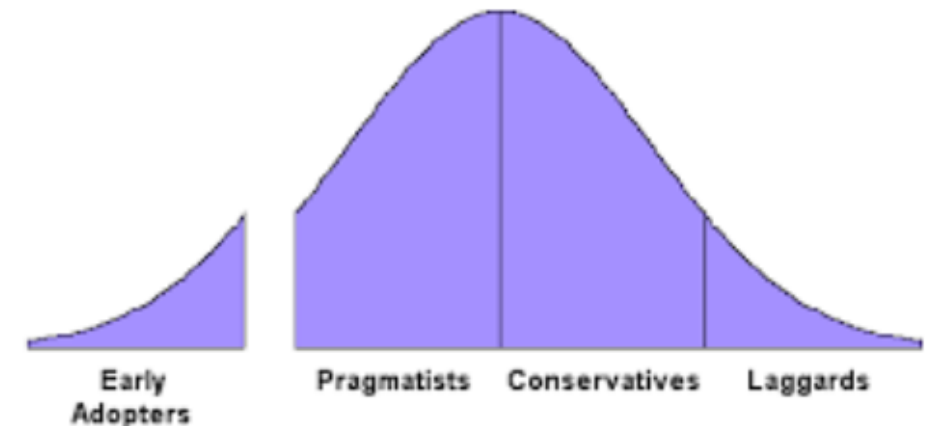


### 3. Expert Vetting

- Asset Owners need to find an independent consultant or an outside engineering firm to evaluate public and proprietary information for agency if an internal expert is not available
- **Experts can help write RFPs and SOWs** to help owners get actionable data to solve real problems
- Technology owners should engage **industry specific experts** to help ascertain levels of ruggedness, what proof testing will be adequate and to eventually make introductions to owners
- Technology advancements make it harder and harder to be an effective jack of all trades

## 4. Lead State/Internal Champion

- There are states that are notorious early adopters and innovators
  - This list changes about every 5-10 years
  - Some states which used to be innovators are no longer, whereas some states step into innovation through new personnel or necessity
- Finding that agency and the internal champion within that agency is key
- Help your champion do their “internal sales” in any way you can – ROI, case studies, etc.



## 5. Laboratory Proof Testing

- If brand new to the industry, laboratory proof testing by an independent source is necessary
- Some states may require this through one of their trusted university partners or their own state laboratory (VA, FL, etc.) or even the FHWA
- The testing should mimic the real world situation as closely as possible to help gain confidence with asset owners

## 6. Field Demonstration Testing

The big one

- Get the owner to let you show what your technology does
- Get the technologist to show you their value
- Potentially, paid as part of an on-call contract, research or perhaps *gratis*
- Hugely important step in demonstrating not only that the technology works but its **value** to the bridge industry



## 7. Group Proof Testing

- Occasionally, there are opportunities to get several owners together to help fund the proof testing or obtain funds from the federal government
- Sometimes manufacturers can utilize programs such as AASHTO Aii (formerly TIG) to do proof testing with grant money
- TSP<sub>2</sub> working groups
- Generally larger projects where several technologies can be demonstrated at the same time or compared
- Every Day Counts, SHRP<sub>2</sub>, TIGER
- But need champion after the group funding to continue moving forward
- Very popular in the Oil & Gas Sector

# 8. Knowledge Transfer Database

- Fairly new in terms of executing effectively
- Used to be at regional meetings, at best.
- TSP2 – Pavement and some others are moving this forward
- Needs to be a safe place for owners to share their successes as well as lessons learned
- Good examples
  - LTBP Database
  - ABC Database (FIU)
  - AASHTO NTPEP

## 9. Specifications

- Process needs to be faster with incorporation of more experts – in-state expertise is not broad enough anymore
- Transitional standard practice documents needed – guidance documents (TRB), ASTM?
- AASHTO/NSBA/TTCI Technical briefs



# 10. Procurement Options

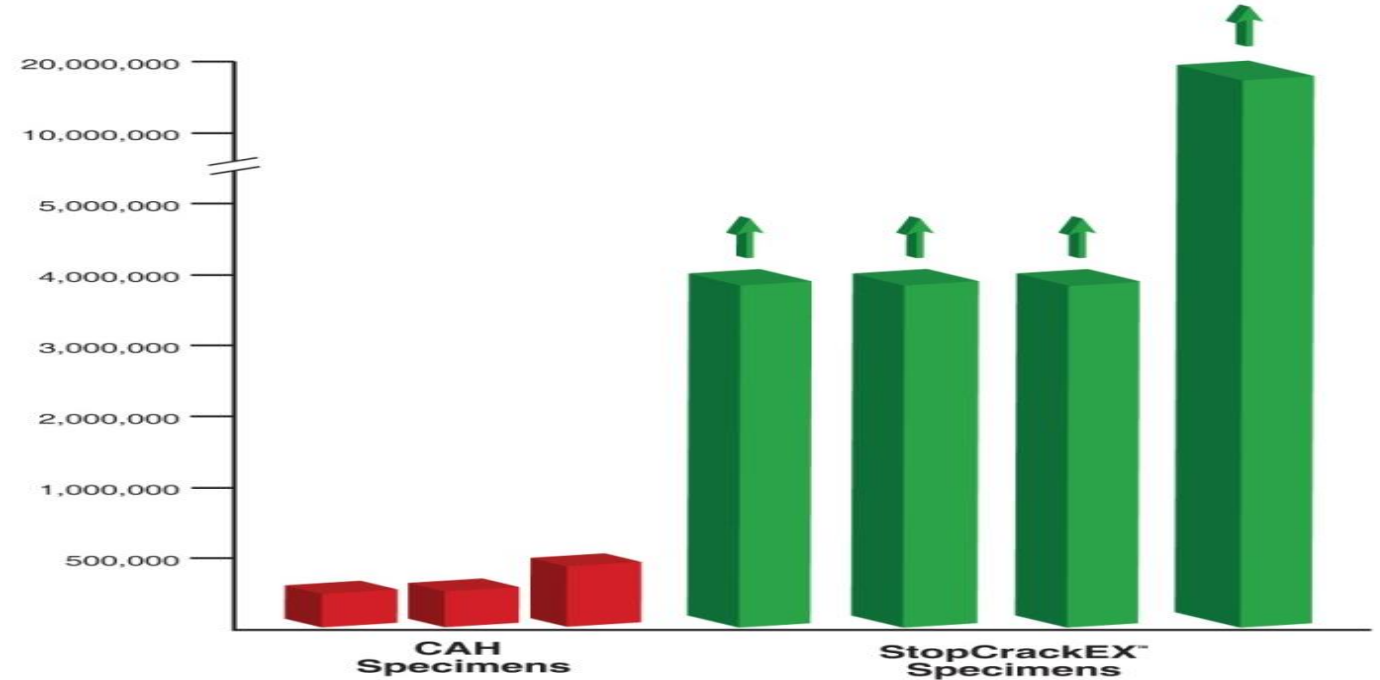
- Make it easy on the owners – Be flexible on procurement
- States vary in terms of how they can procure technology and/or services
- Work together as a team to figure out best way to get it done

# Case Study

## FTI's StopCrackEX

- Aerospace used for 40 years
- Lab proof testing
- Field proof testing
- Written into spec in NYS
- Industry Champion - Keegan
- Taught in the NHI course
- 6 years in
- Procurement challenges
- Widespread adoption?

Independent Coupon Test of StopCrackEX™ vs Crack Arrest Hole (CAH)



Repair Complete: 'Crack Arrest Hole' (left), 'StopCrackEX Hole' (right).

# Conclusion

- Standard process adoption or guidance can help owners, service providers, and technology manufacturers move forward in a more expeditious manner utilizing parallel technology transfer, a well thought out proof testing plan (lab and field), organized funding sources and a lot of perseverance.
- However, it is important to realize most companies do not have the patience nor adequate disposable income to perform technology development in the surface transportation industry.
- By working together – owners, manufacturers and consulting engineers – we can speed the adoption of new tech and increase the efficiency of the industry as a whole

# Acknowledgements

- WSP
- FTI
- MFS