

Meeting Minutes: NRRA Intelligent Construction Technologies (ICT) Team

(Agency & Associate Member Meeting)

Date: May 6, 2021
 Minutes prepared by: Rebecca Embacher
 Location: Microsoft Teams
 NRRA Team Webpage: <http://www.dot.state.mn.us/mnroad/nrra/structure-teams/intelligent-construction/index.html>

Attendance

Agency Members

Participated	Affiliation	State Contact	e-mail
<input type="checkbox"/>	California	Deepak Maskey	deepak.maskey@dot.ca.gov
<input type="checkbox"/>	California	Ragu Thangavelautham	raguparan.thangavelautham@dot.ca.gov
<input type="checkbox"/>	Illinois	Brian Hill	Brian.Hill@illinois.gov
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<input checked="" type="checkbox"/>	Illinois Tollway	Signe Reichelt	smreichelt@behnkematerialsengineering.com
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<input checked="" type="checkbox"/>	Michigan	Jason Clark	ClarkJ25@michigan.gov
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<input checked="" type="checkbox"/>	North Dakota	Curt Dunn	cdunn@nd.gov
<input checked="" type="checkbox"/>	North Dakota	Amy Beise	abeise@nd.gov
<input type="checkbox"/>	Wisconsin	Drew Kottke	Drew.Kottke@dot.wi.gov

Associate Members

Participated	Affiliation	Contact	e-mail
<input type="checkbox"/>	American Engineering and Testing, Inc.	Derek Tompkins	dtompkins@amengtest.com
<input checked="" type="checkbox"/>	Braun Intertec	Mohammad Sabouri	msabouri@braunintertec.com
<input type="checkbox"/>	Braun Intertec	Heidi Olson	holson@braunintertec.com
<input type="checkbox"/>	California State University, Los Angeles	Mehran Mazari	mmazari2@calstatela.edu
<input type="checkbox"/>	Caterpillar Global Paving	Brian Nagel	Nagel_Brian_D@cat.com
<input checked="" type="checkbox"/>	Caterpillar Global Paving	Todd Mansell	mansell_todd_w@cat.com
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<input type="checkbox"/>	GSSI	Roger Roberts	roger@geophysical.com
<input type="checkbox"/>	GSSI	Rob Sommerfeldt	sommerfeldtr@geophysical.com
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<input type="checkbox"/>	Leica Geosystems	Brad Adams	brad.adams@leicaus.com
<input checked="" type="checkbox"/>	Consultant	Erv Dukatz	flyereld@gmail.com
<input type="checkbox"/>	Mathy Construction	Matt Oman	matt.oman@mathy.com
<input type="checkbox"/>	Midstate Reclamation & Trucking, Inc.	Dan Schellhammer	dans@midstatecompanies.com
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<input type="checkbox"/>	Minnesota Asphalt Paving Association	Brandon Brever	bbrever@mnapa.org
<input checked="" type="checkbox"/>	Moba	Paul Angerhofer	pangerhofer@moba.de
<input checked="" type="checkbox"/>	Moba	David Shelstad	dshelstad@moba.de
<input checked="" type="checkbox"/>	National Asphalt Pavement Association	Brett Williams	bwilliams@asphaltpavement.org
<input type="checkbox"/>	Surface Tech	Steve Santa Cruz	steve@surface-tech.com
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<input type="checkbox"/>	Terracon	Sheue Torng Lee	Sheue.Lee@terracon.com
<input type="checkbox"/>	The Transtec Group, Inc.	George Chang	GKChang@TheTranstecGroup.com
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<input type="checkbox"/>	Trimble	Kevin Garcia	kevin_garcia@trimble.com
<input type="checkbox"/>	Trimble	Devin Laubhan	devin_laubhan@trimble.com
<input type="checkbox"/>	The University of Texas at El Paso	Nazarian Soheil	nazarian@utep.edu
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<input type="checkbox"/>	Wirtgen Group	Nars Laikram	Laikram.Narsingh@wirtgen-group.com
<input type="checkbox"/>	WSB & Associates	Mike Rief	mrief@wsbeng.com

Friends

Participated	Affiliation	State Contact	e-mail
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<input type="checkbox"/>	North Dakota	Carey Schreiner	
<input type="checkbox"/>	North Dakota	David Bruins	
<input type="checkbox"/>	North Dakota	Nathan Haaland	

Other Attendees: Daniel Clark

Decisions Made

- None

Action items

- Start working on contract paperwork for projects approved for funding.

Agenda

- Update on Membership, Available Funds and Timelines
- NRRA Research and Implementation Projects for Phase II
- NRRA Fall Meeting Plan and Goals

Next Meeting

Date: June 3, 2021

Time: 10:30-11:30AM Central Time

Location: Microsoft Teams

Agenda items: TBD

Meeting Notes

Update on Membership, Available Funds and Timelines (Embacher)

See attached slides.

Reminded Illinois Tollway and Michigan DOT that they can add one more person onto the Executive Committee.

Noted that Alex Middleton (with Mississippi DOT) is missing on the website and table as a member of the ICT team.

NRRA Research and Implementation Projects for Phase II (Embacher)

See attached slides.

The top 13 projects were approved by the executive committee to move forward. Two of them were generated from the ICT team.

The first phase (i.e., phase I of II) for converting Veta from a desktop platform to a web-based platform was approved, along with creation of a standardized Material Delivery Management System (MDMS) (the expanded form of E-Ticketing). The Phase II (for converting Veta from a desktop platform to a web-based platform) will most likely be funded in the future, as there are still Veta funds being held back at this time.

George Chang elaborated on how Veta web will function and that Transtec will be providing the server initially during the initial years of this work. Further discussions will be held (internally to Transtec) as to whether Transtec will continue to host the server, or if another centralized server for states to use will be needed.

There were questions related to the pushing of MDMS data, as to what portions are paid for by the vendor versus the Veta MDMS. It was explained that the same process that was used for intelligent compaction (IC), paver mounted thermal profiling (PMTP) and the dielectric profile system (DPS) will be used for the MDMS. The states will pay for the needed changes within the Veta MDMS platform, and vendors will be responsible for any changes needed on their side of the system.

Discussed the importance of developing a web-based platform for Veta and how this will help with real-time use of technologies during construction. To date, these technologies are often being used as post-processed data to troubleshoot workmanship issues due to Veta being a desktop platform.

Discussed the timeline. The ICT team will wait on approval from the Executive Committee as to when to start moving forward with establishing a contract for the ICT team's approved tasks.

The ICT team will need to start brainstorming intelligent construction technology that is desired to be used during reconstructive efforts. These discussions will begin during the June meeting.

NRRA, MnROAD, NCAT Sponsor Meeting (Embacher)

See attached slides.

The executive committee is discussing the possibility of holding an in-person workshop this fall (September 13-27, 2021) in Minneapolis, MN. It is uncertain as to whether agencies will be able to travel out of state yet due to COVID regulations. For now, please put this in your calendars. More to come.

Intelligent Construction Technology Team

Meeting | 05/06/21

Microsoft Teams



National Road
Research Alliance

Agenda

Update | Membership, Available Funds, Timelines

NRRA Research and Implementation Projects for Phase II

NRRA Fall Meeting Plan / Goals

Executive Committee Members

Joe Holland, Caltrans –California

Tom Pyle, Caltrans –California

Chris Brakke, Iowa

Jeff De Vries, Iowa

Brian Pfeifer, Illinois

Charles Wienrank, Illinois

Cindy Williams, Illinois Tollway

Additional Member?

Jim Foldesi, LRRB

Additional Member?

Kevin Kennedy, Michigan

Additional Member?

John Donahue, Missouri

Brett Trautman, Missouri

Glenn Engstrom(Chair), Minnesota

Duane Hill, Minnesota

Alex Middleton, Mississippi

Cindy Smith, Mississippi

Matt Linneman, North Dakota

Amy Beise, North Dakota

Barry Paye, Wisconsin

Scott Lawry, Wisconsin

Kevin Kliethermes, FHWA

Bob Orthmeyer, FHWA

Team Membership

Agency	Executive	Flexible	Rigid	Geotechnical	Intelligent Construction	Preventive Maintenance
California	Joe Holland Tom Pyle	Kee Foo Raghubar Shrestha	David Lim Leo Mahserelli Dulce Rufino Hamed Sadati	Deepak Maskey	Deepak Maskey Ragu Thangavelauth	Leo Mahserelli Reimond Garcia
Iowa	Chris Brakke Jeff De Vries		Chris Brakke		Jeff De Vries Chris Brakke	
Illinois	Charles Wienrank Brian Pfeifer	Charles Wienrank Jim Trepranier	Charles Wienrank James Krstulovich	Heather Shoup Andrew Stolba	Brian Hill	Mark Gawedzinski
Illinois Tollway	Cindy Williams	Jay Behnke Ross Bentsen John Lavallee	Dan Gancarz Jake Sumeraj	Supraja Reddy	Signe Reichelt Cindy Williams	Max Berry Tom Wilson
Local Road Research	Jim Foldesi	Jim Foldesi	Kaye Bieniek			John Brunkhorst
Michigan	Allison Harris Kevin Kennedy	Nathan Maack	John Staton	Richard Endres	Matthew Bellgowan Jason Clark	Kevin Kennedy Andre Clover
Minnesota	Glenn Engstrom Dwane Hill	John Garrity Shongtao Dai	Bernard Izevbekhai Maria Masten	Terry Beaudry (Chair) Raul Velasquez	Rebecca Embacher (Chair) Kyle Hoegh	Joel Uling (Chair) Jerry Geib
Mississippi	Alex Middleton		Alex Middleton Tucker Stafford	Griffin Sullivan		Alex Middleton Heath Patterson
Missouri	John Donahue Brett Trautman	Dan Oesch (Chair) Paul Denkler	Brett Trautman (Chair) John Donahue	Lydia Brownell Matthew Kraus	Jen Harper Dan Oesch	Phillip Ruffus Mike Shea
New York (ICT Only)	--	--	--	--	Edward Collins Brett Dean Brett Heim Zoeb Zavery	--
North Dakota	Amy Beise Matt Linneman	Greg Olson Tyler Wollmuth	Duane Carlstrom TJ Murphy	Matt Kurle Colter Schwagler	Amy Beise Curt Dunn	Jesse Nelson Stephanie Weigel
Wisconsin	Scott Lawry Barry Paye	Steven Hefel Dan Kopacz	Peter Kemp	Robert Arndorfer Jeff Horsfall	Drew Kottke	Peter Kemp Myungook (MK) Kang

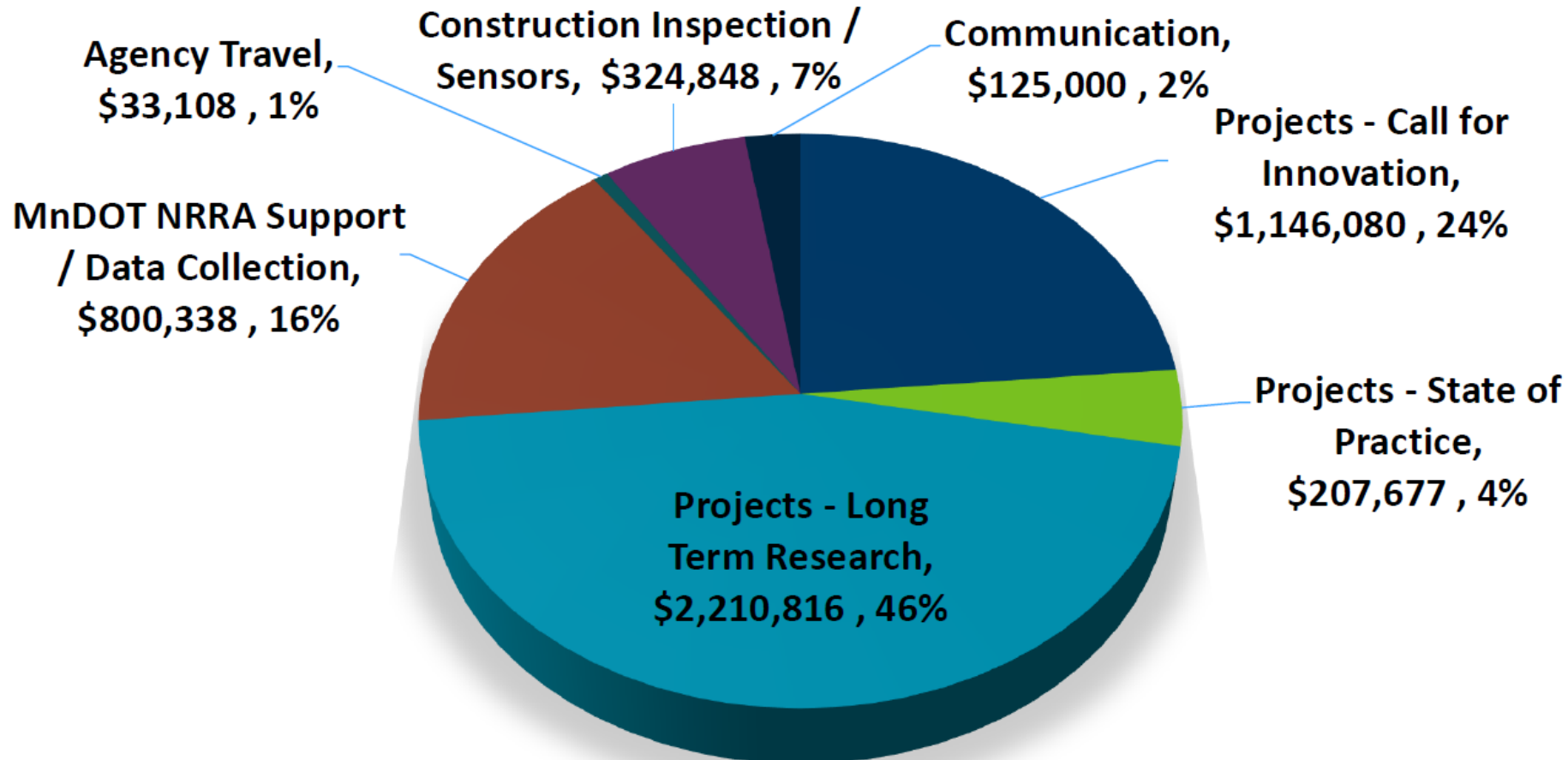
Membership Overview

- TPF-5 (446) – Fee Structure / Year (5 years)
- Full Commitments
 - CA, IA, IL, MI, MN, MO, MS, ND, WI
- Partnerships – Tollway, LRRB
- Veta Only – NY

NRRA Agencies
~ \$1,000,000 per year
(\$5M Overall Effort)

NRRA Associates
~ \$160,000

Phase I / Phase II Funding Summary



- Utilize a number of Contractors again
- MN Construction = 2918 \$3.1 million // 2022 \$4 million
- Other States like MO Roller Compacted Const/Research = \$275,000
- Associate Match Call for Innovation = \$163,746

Phase II Philosophy

Sustainability / Resiliency

Four main sustainability focus areas based on a combination of internal priorities, executive directives, and legislative requirements.

1. Minimize the impact of our operations on the climate and our environment.
2. Reduce greenhouse gas emissions from the transportation sector.
3. Improve the resilience of our transportation system.
4. Promote public health and healthy communities.

Intelligent Construction

Supported by including Veta into NRRA and dedicating funding towards intelligent construction

Phase I / Phase II Funding Summary

	Phase-I		Phase-II		
Agency Travel	33,108	1%	50,000	1%	
Construction Inspection/Sensors	324,848	7%	350,000	7%	
Communication	125,000	3%	-	0%	
MnROAD Data Collection	800,338	17%	800,000	16%	
Research Projects					
Regular	2,210,816	46%	74%	2,125,000	43%
Call of Innovation	1,146,080	24%			
State	207,677	4%			
Veta Directed					
Database - Infopave quote				300,000	6%
	4,847,867		5,000,000		

Top 12 Rankings

1-13 Approved to Pursue by Exec. Committee

Rank	Total Score	NRRA Contract Idea (Links to the needs statements)	Team Ranking	NRRA Research Estimate	MnROAD Needs	CA	IA	IL	IL Toll	LRRB	MI	MN	MS	MO	ND	WI
1	74	MnROAD Reflective Cracking Challenge	Flex 1	225,000	I-94		2	2	1		4	1	1	2	1	
2	59	Recycled Binder Availability	Flex 2	200,000	None		3	3	2		7	4	2	6	2	
3	54	Reduced Cement in Concrete	Rigid 1	150,000	I-94	5	4		3			2		1	4	4
4	44	Reclamation and Recycling Techniques to Achieve Perpetual Pavements Characteristics	Flex 5 PM 2	150,000	I-94	6		6	10		8	3	3		3	5
5	41	Use of Carbon Dioxide for Sustainable and Resilient Concrete Pavements	Rigid 2	150,000	I-94	2	9	4	5		9	5		8	5	
6	37	Convert Desktop Version of Veta to a Web-Based Application and Standardized Material Delivery Management System Platform	ICT 1	400,000	None			8	4		1	6	8	7	6	
7	33	Alternative Cementitious Materials – Geopolymer Concrete	Rigid 3	300,000	I-94	3	5				5	9		5		6
8	25	Flooded Pavements Assessment App–Phase II	PM 5 Geo 4	200,000	No	1								9	8	1
9	22	Thinlays as a PM Treatment	PM 1	50,000	I-94			1	9				5		10	8
10	18	Validation of Loose Mix Aging Procedures for Cracking Resistance Evaluation in Balanced Mix Design (Phase-1 and Phase-2)	Flex 3A	100,000	None		10						6	3		7
11	18	Perpetual Pavements in Wet Freeze Climate	Flex 4	200,000	I-94		6	7								2
12	16	Performance Evaluation of Wicking Geotextiles for Improving Drainage and Stiffness of Road Foundation (ties to 4 and 15 SFDR)	Geo 1	150,000	I-94		7	10	6			7	10	10		

W/ NCAT & MO Partnership

Verify not already being completed by NCHRP

Some ?'s about effort; some members already working in this area. Synthesis available? What is FHWA contribution for research & sensors – might reduce NRRA spending

Bottom 12 Rankings

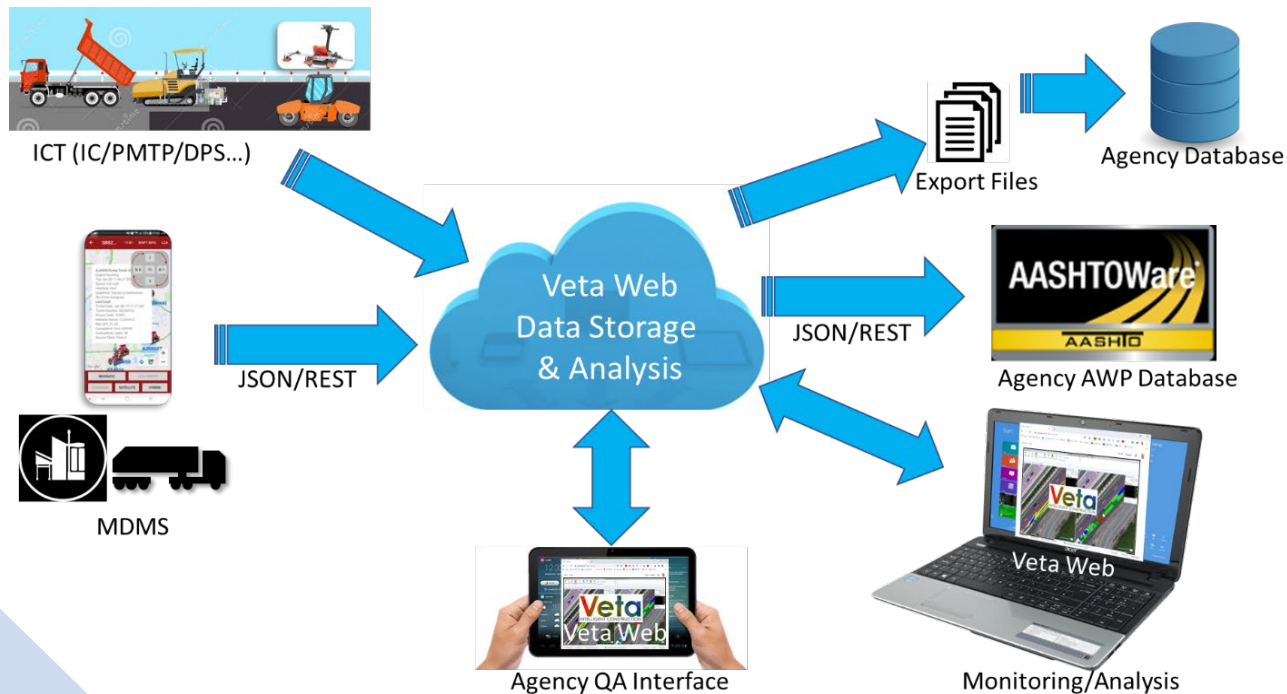
Rank	Total Score	NRRA Contract Idea (Links to the needs statements)	Team Ranking	NRRA Research Estimate	MnROAD Needs	CA	IA	IL	IL Toll	LRRB	MI	MN	MS	MO	ND	WI
13	15	Convert Desktop Version of Veta to a Web-Based Application and Standardized Material Delivery Management System Platform	ICT 2	400,000	None	10			7		2	10				
14	12	Validation of Loose Mix Aging Procedures for Cracking Resistance Evaluation in Balanced Mix Design (Phase-1 and Phase-2)	Flex 3B	250,000	None								7	4		10
15	12	Recycled Aggregate Base & Large Stone Subbase Materials- Phase 2	Geo 2	175,000	None			5			10	8			9	
16	11	Surface Treatments - Impact on Sinusoidal Rumble Strips	PM 3	25,000	No	9					6				7	
17	11	Impact of Flooding on Concrete Pavements	Rigid 5	150,000	Stockpile		8									3
18	10	Optimizing Rigid Pavement Structure Considering Long-Term Performance and Fatigue Characteristics of Stabilized and Non-stabilized Foundation Materials	Geo 3	337,500	I-94		1									
19	9	Utilization of new AASHTO Provisional Standards for Chip Seals (Synthesis)	PM 4	35,000	No								4			9
20	9	Incorporate As-Built Measurements Recorded by Automated Machine Guidance Milling and Paving Systems	ICT 4A	280,000	None	4							9			
21	8	Convert Desktop Version of Veta to a Web-Based Application and Standardized Material Delivery Management System Platform	ICT 3	400,000	None						3					
22	5	Performance Engineered Mixtures in Concrete Rehabilitation	Rigid 4	100,000	I-94			9	8							
23	4	Incorporate As-Built Measurements Recorded by Automated Machine Guidance Milling and Paving Systems	ICT 4B	240,000	None	7										
24	3	Fiber Mixing Tech and Guidelines (Synthesis)	Rigid 6	50,000	No	8										



Unfunded Ideas

- Kept on a list for future use.

Funded ICT Ideas



FUNDED (ICT1)

Phase I: Convert Desktop Version of Veta to a
Web-Based Application
(Hybrid Veta Desktop – Web Version)

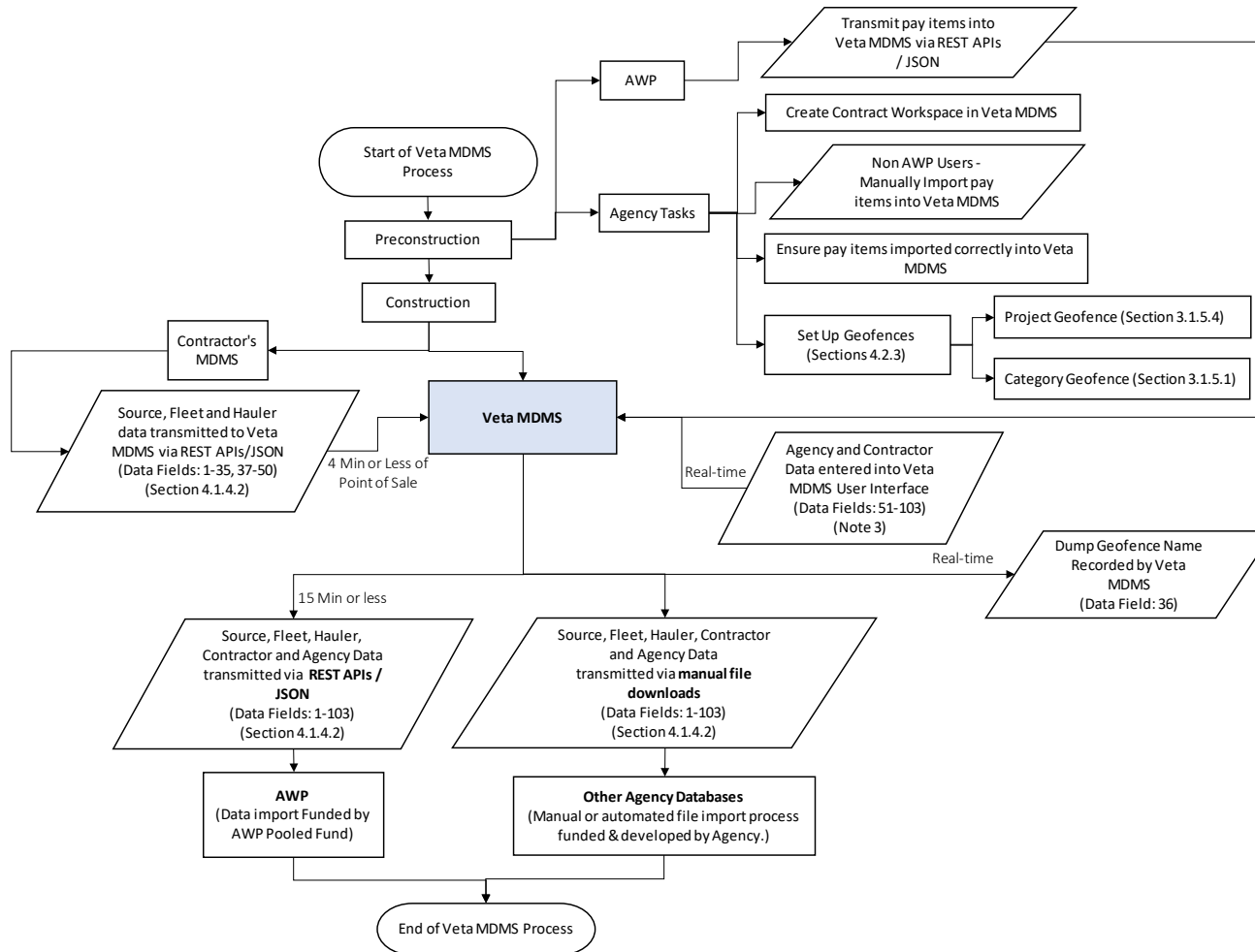
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Machine Collected Data Stored on Server
Manage Users, Permissions, Projects
Calculations Performed on Server
(Filtering, Analyzing, Reporting, Map Creation)
Viewing of Maps, Analyses Results, Creation of
Filter Done Using Desktop Version

Not Funded (ICT3)

Phase II: Full Veta Web Implementation
Remaining Veta Software Components
Recreated on the Web
(Desktop Version no Longer Supported)

Funded ICT Ideas



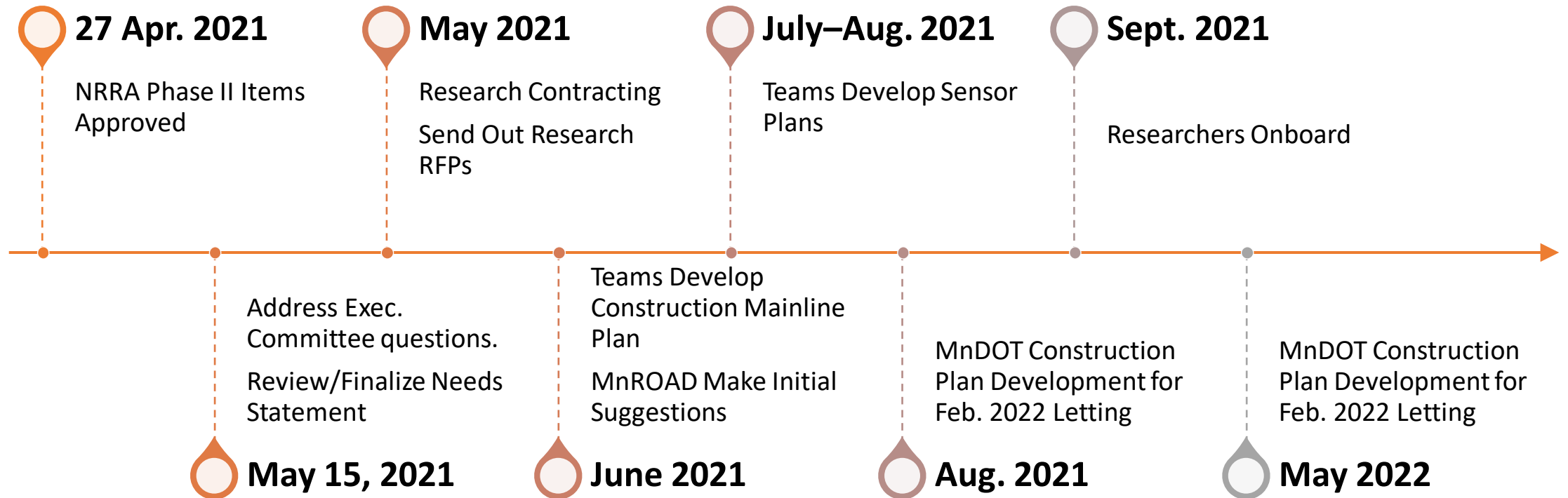
FUNDED (ICT2)

Create a Standardized Material Delivery Management System (MDMS) Platform
(MDMS is the expanded form of E-Ticketing)

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- User Interface Data Entry
- AASHTOWare (AWP) Integration
- Non- AWP – File Exports
- Static Geofences (Project & Funding Category)
- Record Dumping Geofence Name (Eliminate Nested Geofences in Vendor Systems)
- Import Contractor MDMS Data Dashboards
- Data Analyses
- Mapping

Schedule



NRRA, MnROAD, NCAT Sponsor Meeting

Minneapolis, MN | September 13-17, 2021

<p>NRRA National Road Research Alliance Meeting</p>	<p><u>Sept 13 – Monday (2-6 Hotel)</u></p> <ul style="list-style-type: none"> • NRRA Focus <ul style="list-style-type: none"> ○ (2:00-6:00) NRRA Topic or Training, implementation efforts, discuss at NRRA meetings for topics/need? ○ (4:00-6:00) NRRA Executive Meeting ○ (6:30) NRRA reception <p><u>Sept 14 - Tuesday</u></p> <ul style="list-style-type: none"> • NRRA Full Day (9-5 Hotel) <ul style="list-style-type: none"> ○ Executive and Teams will provide input for agenda
<p>Combined Tours</p>	<p><u>Sept 15 – Wednesday (9-5 offsite)</u></p> <ul style="list-style-type: none"> • AM - Tour of MnROAD • Northern Lights – NRRA construction and PG deeper study focus / Lunch Northern Lights • PM - Tour (TH-169, CSAH-8) • MnROAD/NCAT Sponsor Dinner (hotel)
<p>MnROAD/NCAT Sponsor Meeting</p>	<p><u>Sept 16 - Thursday (9-5 Hotel)</u></p> <ul style="list-style-type: none"> • MnROAD/NCAT Sponsor Full Day <ul style="list-style-type: none"> ○ Work with NCAT on agenda items <p><u>Sept 17 - Friday (8-11 Hotel)</u></p> <ul style="list-style-type: none"> • NCAT Focus Topic(s) <ul style="list-style-type: none"> ○ (9:00-11:00) PG Technical advisory panel next two years?, training?, Discuss with NCAT/need?