IOWA'S AUTOMATED TRANSPORTATION VISION

IOWA ADVISORY COUNCIL ON AUTOMATED TRANSPORTATION

Iowa Advisory Council on Automated Transportation

Iowa Department of Transportation

IOWADOT

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1. SUMMARY

This document is intended to serve as an automated transportation development roadmap for the Iowa Advisory Council on Automated Transportation (ATC or "Council") and the Iowa Department of Transportation (Iowa DOT) as they work to safely advance automated transportation in Iowa. Automation in transportation is disruptive, and it is accelerating. However, the mobility benefits are potentially enormous. Safely getting to those benefits in Iowa requires clear strategic direction, sustained programs and ongoing efforts, and focused activities.

Iowa's progress toward automated transportation is happening in the context of persistent and pernicious traffic crashes. Figure 1 shows recent annual totals of traffic fatalities and major injuries in Iowa. While injuries may be slowly declining, fatalities remain steady. Delays in realizing the benefits of automated transportation are delays in reducing crashes. Improvements made now support drivers **today** while supporting automated driving systems (ADS) **tomorrow**.

The ATC comprises lead stakeholders who have led the development of this plan to capture recommendations and guide initiatives for automated transportation (AT) in Iowa. These efforts and this document complement the work being done as part of the Cooperative and Automated Transportation (CAT) Service Layer Plan (SLP) and related highway automation readiness efforts in Iowa and nationally.

1.1. Key Objective Areas

Six key objective areas are identified by the ATC. Current and planned initiatives within these areas are displayed in Figure 2 and briefly listed below. The first four each correspond to an ATC subcommittee, while the last two are crosscutting. Each item is addressed more fully within this document and are part of the ongoing work of the Council and its subcommittees.

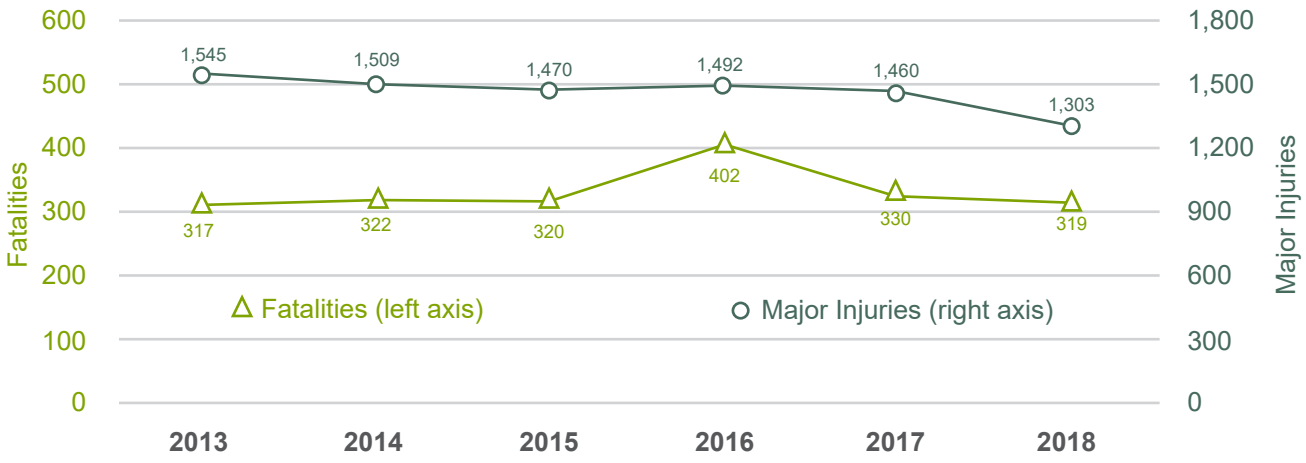


Figure 1. Iowa Serious Traffic Crash History (source iowadot.gov/performance/safety)

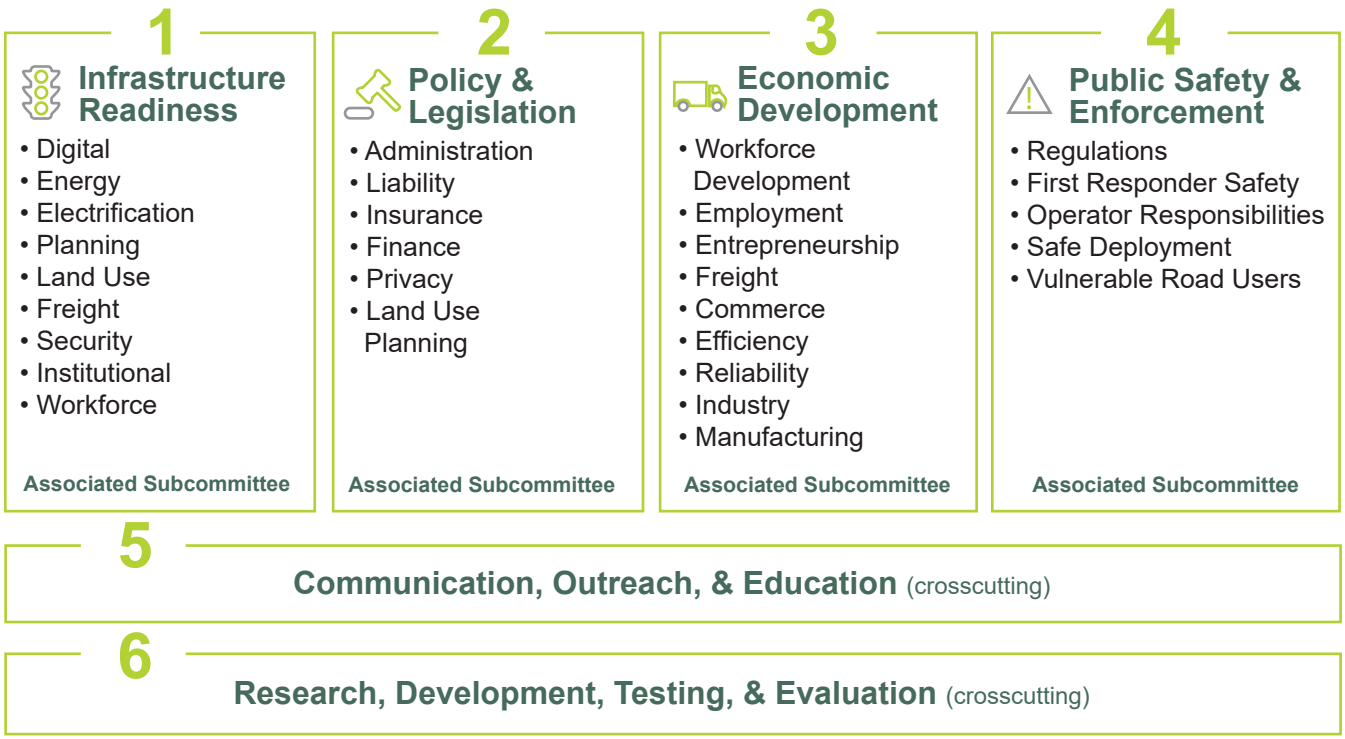


Figure 2. ATC Strategic Objective Areas

1. Infrastructure Readiness

A. Accelerate Infrastructure Readiness - The ATC will support infrastructure readiness initiatives and coordinate with efforts underway within the Iowa DOT and partner organizations.

B. Implement National Guidance - The ATC will always be up to date and work to implement the latest guidelines and best practices for infrastructure readiness in support of AT.

C. Improve Traffic Control Assets - The ATC and Iowa DOT are advancing best practice in maintaining and upgrading traffic control assets to better enable automation and machine vision.

D. Leverage Communications Infrastructure - Iowa's communications infrastructure will be ready for automated transportation applications, including capacity, coverage, and security.

E. Develop Agency Workforce - The ATC will be a recognized resource for AT-related workforce capacity building and supports efforts to close gaps with resources and education.

2. Policy & Legislation

A. Evolve Administrative Rules - The ATC will advise the Iowa DOT and others on the development of administrative rules as needed.

B. Address Liability & Insurance - The ATC will understand how AT affects insurance and liability, assess practices from other states, and coordinate with lead agencies on changes needed.

C. Advise on Legislation - The ATC will suggest legislative changes, assess pending legislation, and offer advice and consultation on AT-related legislation.

D. Policymaker Outreach - Policymakers throughout Iowa at all levels of government will be informed about AT and anticipated impacts on Iowa.

E. Community Readiness - Local governments in Iowa will know about the ATC, can reach out for guidance on planning for AT, and will be better prepared for AT.

3. Economic Development

A. Outreach to Business - The ATC and Iowa corporations will engage in ongoing dialogue and mutual efforts toward advancing AT and achieving its benefits for the Iowa economy.

B. Foster Business Growth - The ATC will be a resource for existing and potential Iowa companies seeking to grow their AT-related business.

C. Improve Freight Movement - The ATC will foster learning and awareness of automated freight movement technology, encouraging AT-enabled advances in freight and logistics.

D. Workforce Development - The ATC will engage with and promote workforce development for Iowa businesses in AT-related areas of need, in collaboration with educational institutions.

4. Public Safety & Enforcement

A. Adapt to Changing Laws - The ATC is the focal point for deliberation on adjustments needed by stakeholders to accommodate changing laws or rules related to AT and safety for all users.

B. Explore Vehicle Automation Indications - The ATC will lead exploration into guidance for external vehicle indicators on ADS-equipped or platoon-capable vehicles.

C. Promote Crash Data & Investigation - The ATC will know what data are available from AVs and will recommend what additional data should be captured from crashes.

D. Ensure Safe Incident Management - As AT proliferates, the ATC will promote advances in incident and crash safety technologies and applications, as well as first responder safety.

5. Communication, Outreach, & Education

- As a crosscutting objective area, this will be woven throughout all activity. The ATC will strive to be well-educated on AT and work to be known to all stakeholders as a resource for information and a conduit for suggestions.

6. Research, Development, Testing, & Evaluation (RDT&E)

- As needed, the ATC and its stakeholders will learn from and advance AT in Iowa by directing and coordinating AT efforts related to RDT&E.

1.2 Next Steps

The visioning work of the ATC in 2019 followed a three-prong framework. First is strategic, revisiting the foundational vision, mission, purpose, and goals for the Council. The six objective areas are the culmination of that step. Second is the programmatic prong, which fleshes out the objectives and leads to specifically defined desired outcomes. And third is the tactical prong, which generated a set of specific tactics that are tied back to outcomes, objectives, and ultimately the strategy.

The tactical prong is where this vision document leaves off. Individuals among all subcommittees weighed in on the priorities they want to pursue, which are presented at the end of this document. In 2020, each of the six objective areas are proceeding with work plans to continue guiding next steps. These work plans will document the tactical priorities, roles and responsibilities, resourcing, planning, and timelines.

1.3. Communications

The ATC maintains a public website - https://IowaDrivingAV.org/ - as a centralized hub where people can go for more information. Please refer to the Contact Us page with any questions, requests, or suggestions related to automated transportation in Iowa.

2. OVERVIEW & APPROACH

Transportation agencies worldwide are grappling with many disruptive technologies and operational strategies arising from ever-increasing connectivity and automation. These span the sharing economy, big data, internet of things, cooperative and connected applications, cybersecurity, automated[1] vehicle (AV) technology, artificial intelligence, and faster mobile networks. Whether it is called the Information Age or the 4th Industrial Revolution, this is stressing traditional approaches to doing business. This is especially true for agencies charged with delivering safe and efficient mobility.

> **The Iowa ATC Purpose**
>
> "The Iowa Advisory Council on Automated Transportation is **intended to increase roadway safety, personal mobility, and freight movement** within the state of Iowa by advancing highly automated vehicle technologies. The Council shall provide guidance, recommendations, and strategic oversight of automated transportation activities in the state."

As the Automated Transportation Council (ATC) was formed, a charter was developed and established as foundational guidance for ATC activity.[2] The initial strategic guidance for automated transportation (AT) in Iowa is found within the purpose, vision, and mission of both the ATC and the Iowa Department of Transportation (DOT). These emphasize the **shared values of safety, mobility, efficiency, and customer focus**, and guiding transportation improvements through enabling and advancing automation.

Iowa's strategy for AT extends beyond just the numbers to the double bottom line, a term that reflects positive social and environmental benefits that may not be reflected in a traditional bottom line. As the transportation community is yet at the beginning of gradual shift to automation, with mixed fleets persisting for decades to come, the ATC pushes for improvements that benefit all users today as well as accelerate the adoption of ADS benefits for tomorrow.

This is complex, and an initial effort of the ATC and its subcommittees has been to identify priority issues and needs. This vision document constitutes the plan for automated transportation (AT Plan) to address and close gaps in Iowa.

2.1. Stakeholders

There are multiple stakeholders and organizations involved in and affected by transportation automation. Each brings different expertise, motivations, and viewpoints - sometimes competing - which are interwoven throughout the complexities and uncertainties with the technologies, timelines, policies, liability, equity, enforcement, and so many more aspects needing to be addressed. Table

1. The terms driverless, self-driving, automated, and autonomous are sometimes used interchangeably despite each having distinctions. In this document the term automated is used as the broadest term.
2. The charter is appended to this document for reference.

1 summarizes stakeholders and roles involved with AT in Iowa and the ATC. This is derived from the ATC Charter (see Appendix C) and is not a comprehensive list of stakeholders. Many organizations and individuals are involved through the subcommittees or in other capacities. For example, the Fire Service Training Bureau within the Department of Public Safety is instrumental in educating Iowa's first responders and is active with the Public Safety & Enforcement Subcommittee.

Table 1. Iowa AT Stakeholders

Stakeholder	Role(s)
Associated General Contractors of Iowa	ATC member, transportation infrastructure
Federal Highway Administration (FHWA), Iowa Division	ATC *ex officio* member, infrastructure, policy, Stewardship / Oversight Agreement
Federal Motor Carrier Safety Administration	ATC *ex officio* member, freight movement safety and policy
Freight Advisory Council	ATC member, freight and commerce
Iowa City Area Chamber of Commerce	ATC member, economic development
Iowa Department of Agriculture and Land Stewardship	ATC member, agriculture and rural transportation
Iowa Department of Public Safety (DPS)	ATC member, public safety
Iowa Department of Transportation (DOT)	ATC member, lead agency and chair of the ATC
Iowa DOT Motor Vehicle Division	ATC member, licensing, regulation, and enforcement
Iowa DOT Research and Analytics Bureau	Implications of AT on assets and data
Iowa DOT Strategic Communications and Policy Bureau	ATC member, communications
Iowa DOT Systems Planning Bureau	Planning for advanced mobility
Iowa DOT Traffic Operations Bureau	Lead Bureau for AT
Iowa Economic Development Authority	ATC member, economic development
Iowa Insurance Division	ATC member, liability and insurance
Iowa League of Cities	ATC member, local governance
Iowa Legislature, House of Representatives	ATC *ex officio* member
Iowa Legislature, Senate	ATC *ex officio* member
Iowa Motor Truck Association	ATC member, freight and commerce
Iowa State Association of Counties	ATC member, local governance
Iowa State Patrol	ATC member, enforcement and public safety
Iowa State University	Expertise in AT, AV, infrastructure, and operations
Iowa Transportation Commission	Policy, program determinations, administrative rules
Iowa Transportation System Users	All system users, e.g., motorists, freight movers, transit riders, bicyclists, pedestrians
Metropolitan Planning Organizations	Responsible for a range of transportation and land use issues
National Highway Traffic Safety Administration (NHTSA)	ATC *ex officio* member, policy and vehicle regulation
Technology Association of Iowa (TAI)	ATC member, economic and workforce development
University of Iowa	ATC co-chair for management and logistics, AV expertise

2.2. Selected Resources and References

Numerous resources and references are available as background for the AT Plan both from within Iowa and nationally. Selected examples are listed here.

- Iowa DOT Transportation Systems Management and Operations (TSMO) Strategic Plan, Program Plan, and Service Layer Plans[3]
    - Iowa DOT Cooperative Automated Transportation (CAT) Service Layer Plan (in progress)
- Related Iowa plans, e.g.,
    - State Transportation Plan (STP), "Iowa in Motion 2045"
    - Strategic Highway Safety Plan (SHSP)
    - Highway Safety Plan (HSP)
    - Commercial Vehicle Safety Plan (CVSP)
    - Other modal, metro, or regional plans
- Iowa DOT Automated Vehicle Technologies Project [4]
    - Key academic partners, e.g., the University of Iowa, Iowa State University
- Iowa Automated Vehicle Proving Grounds
- Multistate Cooperative on Highway Automation Readiness (MCHAR)
- National Cooperative Automated Transportation (CAT) Coalition[5]
- National Strategy for Highway Automation (AASHTO)

Innumerable other resources exist, and new developments, advice, and guidance are continuously emerging. For instance, there are compendia of plans and policies available; many practices among peer agencies from which to learn; professional organization standards and guidance;[6] resources from national organizations such as the American Association of Motor Vehicle Administrators,[7] the American Association of State Highway and Transportation Officials (AASHTO),[8] the National Conference of State Legislatures (NCSL),[9] or the National Association of Insurance Commissioners (NAIC);[10] federal guidance on automated vehicle (AV) technology and policy,[11] including the current USDOT policy, *Automated Vehicles 3.0, Preparing for the Future of Transportation;*[12] and a wealth of academia literature on every topic related to automation. This document is not a treatise on any particular set of details; these are mentioned here to punctuate the complexity and magnitude of automated transportation.

The emphasis here is on automated transportation in a fairly broad sense, recognizing that connectivity and automation in transportation are increasingly inseparable. This includes aspects of automated and/or connected vehicle (CAV) systems and technology, as well as coordinated or cooperative[13] applications.

3. https://iowadot.gov/tsmo
4. March 2017 Vision Document, https://iowadot.gov/pdf_files/IowaVisionDocument.pdf
5. https://transportationops.org/CATCoalition
6. e.g., https://www.sae.org/standards/content/j3016_201806/
7. https://www.aamva.org/Autonomous-Vehicle-Information-Library/
8. https://cav.transportation.org/
9. http://www.ncsl.org/research/transportation/autonomous-vehicles.aspx
10. https://www.naic.org/cipr_topics/topic_self_driving_cars.htm
11. e.g., https://www.nhtsa.gov/technology-innovation/automated-vehicles-safety
12. https://www.transportation.gov/AV

2.3. Three-Prong Planning Framework

The ATC stakeholders are addressing the roadmap for automated transportation with a three-prong approach: strategic, programmatic, and tactical. These are depicted in Figure 2.

The broad direction is set at the strategic level, which has already been introduced in this document and will be picked up again Section 3. The purpose, vision, and mission establish the ideals and values to be pursued, addressing the question as to why the ATC exists. Following from those are strategic goals, and the ATC has defined five of these that will be recapped next. Carefully considered goals, distinct from outcomes and activities, are the heart of the strategic prong. Flowing directly from goals are objectives, wherein greater specificity comes in. The ATC has developed six objective areas to focus on, which form the bridge to the programmatic prong.

The ATC establishes clear objectives and outcomes to guide what is to be accomplished, and the programmatic prong defines the roles, responsibilities, processes, procedures, and resources needed. The ATC is not a single organization or institution, but a consortium that has come together in a largely volunteer capacity. Unlike a top down approach that may work within a corporation, the ATC is not itself creating new programs, but rather outlining the programmatic needs. Identifying resources and following through is entirely dependent on collaboration.

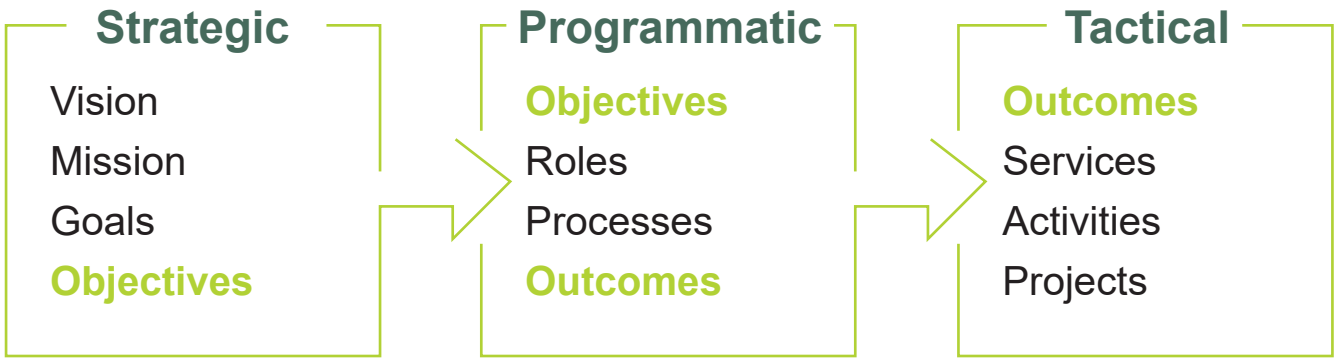


Figure 3. AT Plan Three-Prong Framework

13. The “C” in these contexts and acronyms has traditionally stood for “connected,” as in a CV application; but there has been a shift in favor of “cooperative” as a more encompassing term, broader than just a communications or telecom dependent application; and “coordinated” in technical use is often intended for point to point applications such as a coordinated traffic signal

3. STRATEGIC FOUNDATION

The stated purpose of the ATC is "*…to increase roadway safety, personal mobility, and freight movement within the state of Iowa by advancing HAV technologies. The Council shall provide guidance, recommendations, and strategic oversight of AT activities in the state.*"

> **ATC Vision**
>
> To create an AV-ready driving environment in Iowa for the safe movement of people and freight for a thriving Iowa economy
>
> **ATC Mission**
>
> Lead, coordinate, and enable the advancement of AT systems in Iowa

From this purpose statement comes the broad intent to pursue increased *safety, mobility, and freight movement*. In the automated transportation context, this is to be achieved by advancing highly automated vehicle technology, providing guidance and recommendations, and executing strategic oversight of AT in Iowa. These ideas are further developed in the ATC vision and mission statements.

3.1. ATC Strategic Goals

The five stated goals for the ATC, as listed in the ATC charter, are:

1. Function as a catalyst and forum for AT systems and AV technologies
2. Discuss policy and strategies to further effective and successful research, development, testing, operation, and implementation of AVs in the state of Iowa
3. Provide coordinated feedback on AVs to both public and private entities
4. Promote testing and deployment and remove barriers
5. Provide a forum for education and outreach on AT systems and AVs

For planning purposes, taking those goals as stated, in early 2019 the ATC revisited the purpose, vision, mission, and goals to ensure these capture what is needed, and to ensure membership buy-in. The ATC objectives – following from goals – are leaned on for developing clarity of purpose as they are kept somewhat broader and elevated.

3.2. Topical Themes

Within the strategic prong, revisiting and clarifying goals and getting to a set of objectives was a central part of discussion during the Council meeting on March 29, 2019. The conversation was facilitated by reflecting on goal-focused (distinct from outcomes or activities) themes elicited from the purpose, vision, mission, five stated goals, and stakeholder input. These are captured into the following general theme areas, within which many of the specific words and phrases are drawn from those sources.

- Mobility and safety, inextricably linked, creating positive change for those, reducing driver error, including freight mobility
- Develop and provide policy guidance, recommendations, and advice

- Provide strategic oversight for AT activity in Iowa, assess pros and cons of alternative strategies
- Be a catalyst or discussion, the primary forum, gather and provide feedback
- Promote outreach and education to diverse stakeholders
- Provide leadership and be the focal point of collaboration on AT issues throughout Iowa
- Keep Iowa economically competitive, pursue the thriving economy
- Remove barriers, create the AV-ready environment, ready infrastructure (physical, digital, institutional)
- Lead AT advancements
- Support communities, public interest, accessibility and equity, local government and governance, attend to distinct needs of urban vs rural, including freight

Certain related areas of consideration, sometimes found in other plans, are not explicitly addressed in this document per the ATC. These are not overlooked, rather some may be captured as part of other items, subjugated to other priorities, or left for future consideration.

- First is the explicit promotion and advancement of any specific AV technology itself. As these are largely market driven, subject to rules and regulations, the Council's role is removing barriers, collaborating with industry, and promoting general adoption and proliferation of AV technology that improves safety, mobility, and freight movement.
- Another is consideration of other modes such as rail, air, water, transit, biking, walking. While these all remain important, the focus for AT in Iowa is on motorized surface road transport. Because safe and efficient freight movement remains a goal, this will necessarily interface with other modes of freight movement (e.g., rail, water, ports). And because broad safety remains a goal, an emphasis on safe proliferation of AT for all modes - transit users and bicyclists, pedestrians, and other vulnerable road users (VRUs) - pervades all that the ATC undertakes.
- Equity and accessibility – while incorporated in places, e.g., related to community readiness or public outreach, and as a policy tactic – is not its own objective area. Effects on various populations, public health, urban vs rural opportunities, mobility barriers, and related societal challenges should be woven in wherever meaningful. Benefits from AT ought not outweigh new risks to VRUs as communities adopt complete streets, microtransit, and improved mobility options for all users.
- Regulatory approvals for AVs in Iowa is not addressed in this vision because of current Iowa Code and it being the purview of a single agency (Iowa DOT). This relates to administrative rules development (see section 4.2.2), and if permitting or approvals are needed, this will be addressed later.

3.3. AT Objective Areas

The deliberation on the strategic prong thus far has coalesced into six objective areas:

1. Infrastructure Readiness, spanning the various dimensions of physical, digital, energy, security, institutional, workforce, and supporting topics
2. Policy & Legislation, which addresses legal and liability issues, insurance, administrative rules, finance, privacy, and related issues
3. Economic Development, supporting the Iowa economy and businesses, addressing barriers, and striving to maximize the value and benefit from AT
4. Public Safety & Enforcement, ensuring the thoughtful and safe proliferation of automation, developing procedures for law enforcement and first responders

5. Communication, Outreach, & Education, being the focal point of deliberation, a conduit for feedback and concerns, and collaboration among the many diverse stakeholders

6. Research, Development, Testing, & Evaluation (RDT&E), an ongoing effort that weaves throughout each of the other areas.

The first four coincide with four standing subcommittees of the ATC. The last two are crosscutting. Although they have no corresponding standalone subcommittees, work groups will be formed as needed on a regular or ad hoc basis. Figure 3 summarizes these six areas.

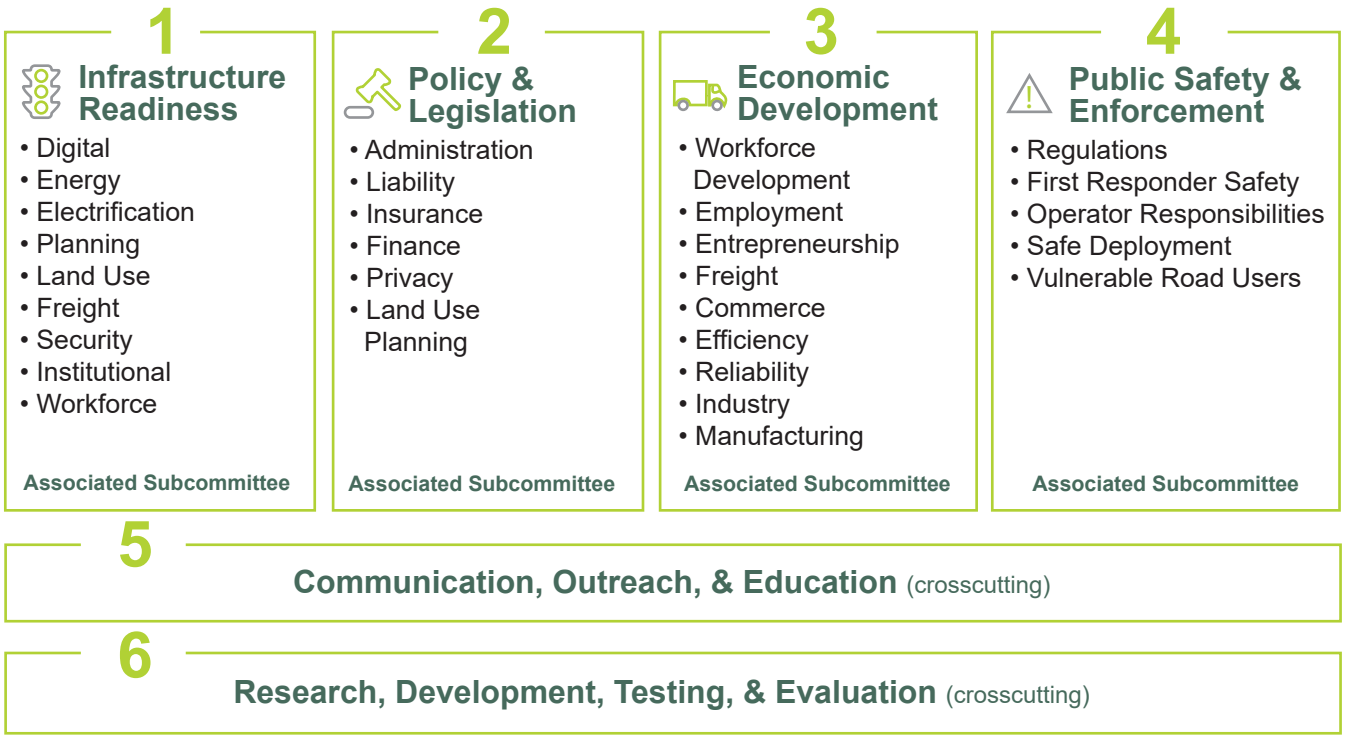


Figure 4. ATC Strategic Objective Areas

These objective areas are developed further in the programmatic prong in Section 4.

4. PROGRAMMATIC APPROACH

4.1. Strategic Objectives

In defining objectives, stakeholders strive to make them more specific and descriptive than goals. As the goals were previously stated and described, attention turns to carefully outlining ATC objectives.

These objectives are the bridge between the strategic and programmatic prongs. Cascading next from objectives are the more specific results or outcomes to be pursued through subcommittee work, which are addressed in the next section on the tactical prong.

4.2. Objective Areas

This section gathers the strategic direction presented so far into the AT objective areas. Within each area, what is to be accomplished is further defined in terms of specific outcomes. Just as objectives are the bridge from strategic to programmatic, outcomes are the bridge from programmatic to tactical.

4.2.1. Infrastructure Readiness

Infrastructure readiness alone is a broad, complex, and rapidly evolving area of automated transportation. Figure 4 summarizes the three general areas of infrastructure readiness for AT, and includes examples attached to each that have been culled from discussions in the ATC, subcommittees, and other resources.

Two Iowa-specific guidance documents are included here by reference and because of the close linkage with highway automation infrastructure readiness.

First, although generally dormant, Iowa's 2017 Automated Vehicle Technologies Project vision document[14] remains a useful Iowa-specific resource for infrastructure readiness. The stated goals resonate well with, and are likely a precursor to, the ATC goals. The emphasis is primarily on the physical and digital infrastructure needs to support AT, including data aggregation and dissemination, high definition (HD) dynamic mapping, and communications. The four key capabilities that were to be pursed are illustrative of Iowa's aspiration to be

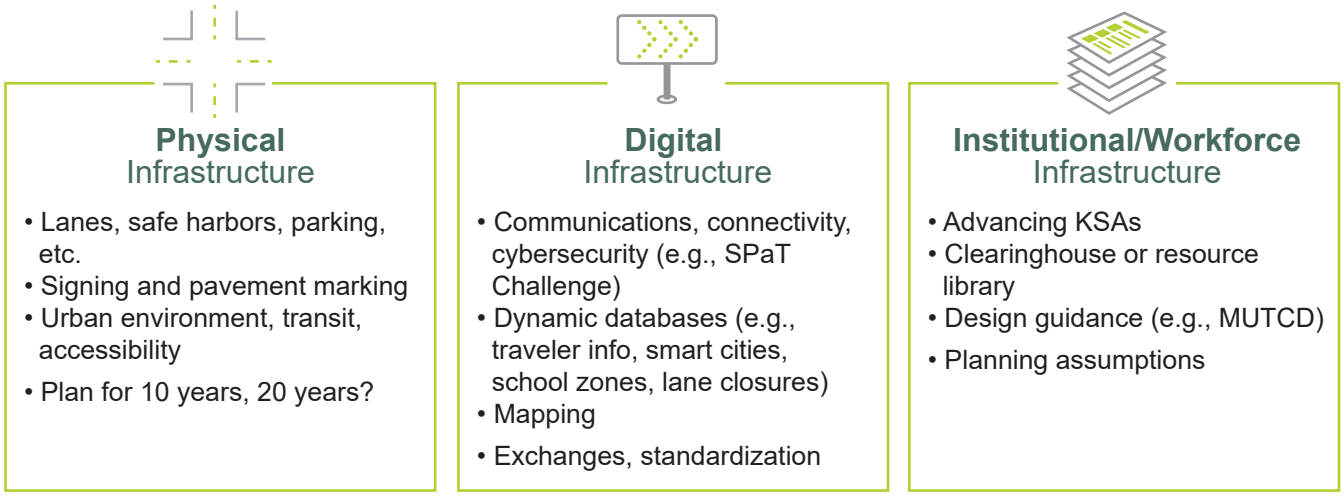


Figure 5. Infrastructure Readiness Areas

14. March 2017 Vision Document, https://iowadot.gov/pdf_files/IowaVisionDocument.pdf

a leader in this space. These are repeated here for awareness and consideration:

1) Real-time V2X Hazard Alerting for Crashes, Weather, Work Zones, Obstacles, Traffic Jams, and Special Events for use by drivers and automated vehicles.

2) Advanced Predictive Travel Condition Datafeeds for use by drivers and automated vehicles.

3) Real-time availability of core AV-Ready Datafeeds for ingestion by automated vehicles. This includes High Definition (HD) Maps for key corridors.

4) Real-time Driving Environment Data for use by the state traffic management center (TMC) and state fleets.

Second is Iowa DOT's CAT Service Layer Plan (SLP), which was finalized in November 2019. This Plan covers digital CAT infrastructure, physical infrastructure, pilots, and several other topics that span all six ATC objective areas. It is critical not to duplicate efforts given such scarce time and resources, and the AT Plan and CAT SLP are intended to be complementary. The CAT SLP focuses on the Iowa DOT with an internal and operational emphasis, while the ATC purview is broader.

Related to Iowa DOT's internal CAT work is the application of the TSMO Capability Maturity Model to cooperative (connected) and automated transportation. The Iowa DOT has completed a self-assessment, the results of which include next steps to advance among any of the six maturity dimensions: business processes, systems and technology, performance measurement, organization and workforce, culture, and collaboration. It is mentioned here without further elaboration to capture it as an important point of coordination relevant to infrastructure readiness.

A. Accelerate Infrastructure Readiness

Iowa has the ability to better position itself to achieve benefits from AT sooner and to greater extent than if a hands-off stance is taken. Proactively preparing infrastructure accelerates lifesaving cooperative and automated transportation technology, benefiting operations, mobility, and society. The ATC will play an active role to ensure Iowa's infrastructure – physical, digital, and institutional – is being readied to accommodate cooperative and automated transportation. This umbrella topic may include such things as roadside communications, traffic control (markings, signs, devices), electrification, modifying lane configurations, and myriad other possibilities.

OUTCOME

The ATC will support infrastructure readiness initiatives and coordinate with efforts underway within the Iowa DOT and partner organizations.

B. Implement National Guidance

Chief among the infrastructure readiness objectives is for the ATC and Iowa to stay abreast of national guidance. Automakers and CAV technology companies want to avoid state patchworks of any sort, including infrastructure, and they work primarily though national organizations. Issues of standardization and data sharing are continuously deliberated upon at the national level, and Iowa must remain aware of the progress in these areas, to the extent guidance emerges.

Of particular note, the Society of Automotive Engineers (SAE) - the same group that orchestrates the oft-cited levels of driving automation - has an infrastructure needs task force, emphasizing standardization and consistent communication. Others to keep track of are the updates to the Manual on Uniform Traffic Control Devices (MUTCD), the AASHTO Coalition on National Strategy for Highway Automation, the National CAT Coalition, publications from the National Cooperative Highway Research Program (NCHRP), the National Association of City Transportation Officials, the

Institute of Transportation Engineers, the Federal Highway Administration (FHWA) and any new outputs from its National Dialogue on Highway Automation, and numerous associations such as the National League of Cities (NLC), National Association of Counties (NACo), or the National Association of City Transportation Officials (NACTO).

AASHTO in particular is leading much of the nationally coordinated efforts in highway automation and moving forward with specific projects for the national vision. The FHWA's National Dialogue has five focus areas, two of which emphasize infrastructure (digital and physical). And for reference, the four NLC guidance items are:

1. Start Planning Now - AVs are already here, and this is complex
2. Develop Policy with the Right People - engage innovative partnerships, keep planning transparent, inclusive, and collaborative
3. Track Federal and State Developments - cities must make their voices heard
4. Plan Infrastructure Needs, Build Digital Capacity – consider both short and long term needs, preserve flexibility, and position your jurisdiction to benefit from automated mobility

OUTCOME

The ATC is always up to date and works to implement the latest guidelines and best practices for infrastructure readiness in support of AT.

C. Improve Traffic Control Assets

Private sector industry working on automated vehicle systems repeatedly encourages transportation agencies to attend to the basics of well-maintained traffic control assets, e.g., traffic signs, traffic control devices, or pavement markings. A prominent need is to support machine vision as much as possible, despite temporary lane shifts in work zones or occasionally obscuration by snow. A tactic that arises in this area is upgrading pavement marking from a 4" to 6" standard, in collaboration with neighboring agencies for seamless travel throughout our region. Improvements may include both physical and digital aspects, and should not be limited by existing practice. The Iowa DOT should explore changes and resources needed, bearing in mind that improvements made for the specific benefit of CAVs will also benefit conventional vehicles.

OUTCOME

The ATC and Iowa DOT are advancing best practice in maintaining and upgrading traffic control assets to better enable automation and machine vision.

D. Leverage Communications Infrastructure

Iowa is well positioned with its existing communications infrastructure to offer a competitive advantage for AT testing and proliferation. In particular, the Iowa Communications Network (ICN) [15] owns and operates eight thousand miles of backbone fiber statewide. The Iowa DOT also owns and operates its own fiber network, which in partnership with ICN covers much of the most heavily traveled segments in Iowa. Ongoing expansion continues; the ITS & Communications SLP contains a wealth of information about this.[16] With emerging fifth generation digital cellular networks (5G), leveraging this communication infrastructure enables far more advance connected (cooperative) vehicle applications, dynamic high

15. ICN is operates under Iowa Code and is governed by a commission, see https://icn.iowa.gov/
16. Iowa DOT's TSMO SLPs: https://iowadot.gov/tsmo/Service-Layer-Plans

definition mapping, and real time information flow. A core consideration in this area is ensuring privacy and cybersecurity.

OUTCOME Iowa's communications infrastructure is ready for automated transportation applications, including capacity, coverage, and security.

E. Develop Agency Workforce

The current transportation agency workforce must adapt to evolving roles and expectations for transportation in Iowa. This is being done within the Iowa DOT, and the ATC has a role to play in identifying gaps in knowledge, skills, and abilities (KSAs) among stakeholders and connecting resources as much as possible to close those gaps. An example of an easy tactic to consider is a general presentation to varied agency staff on AT and considerations specific to Iowa. This weaves directly into the communications, outreach, and education area.

OUTCOME The ATC is a recognized resource for AT-related workforce capacity building and supports efforts to close gaps with resources and education.

4.2.2. Policy & Legislation

The many issues surrounding policy and legislation – including legal, liability, insurance, administrative rules, finance, privacy, and so on – present a fundamental and urgent area of work for the ATC and the Policy & Legislation subcommittee. Out of discussion during the first Policy & Legislation subcommittee meeting in November 2018 came an initial set of questions that the subcommittee intends to tackle:

- What barriers to AT and AVs exist in the Iowa Code? Administrative rules? How can the ATC work to remove these barriers?
- How should policies differ for testing on public roads, special permitting, allowing limited or pilot deployments, and for general adoption?
- In early 2019, prior to the change to following distance going into effect, the subcommittee was asking how the administrative rules need to change for following distance (see item A on the next page)? Is "reasonable and prudent" to be enforced any differently (§321.307)?
- What are the privacy and (cyber)security issues involved? What needs to be addressed in legislation, policy, regulations, or rules?
- For cities, how are municipal codes or ordinances affected by automated transportation, or how should they be modified? What are the implications on land use planning, zoning policy, or parking control?
- How do cities handle requests from ridesharing companies adopting AVs? Registration and liability?

The following five items have been developed by the subcommittee and represent emphasis areas for attention. Each item ends with a stated outcome, which also constitutes the bridge between the programmatic and tactical prongs.

A. Evolve Administrative Rules

Currently at hand, as the automated driving system (ADS) and following distance bills were signed into law in May 2019, many follow-up activities are necessary, e.g., changes needed to administrative rules, adapting protocols for enforcement, clarifying terminology, establishing rules for zero-occupant vehicles. These in effect hand a great deal of work in the tactical prong to the ATC, which must still be guided by the goals to maintain safe, efficient, and convenient travel. The two AT-related bills that went into effect on July 1, 2019 are:

- Defining and Allowing ADS (SF302[17])
- Repealed Following Distances (HF387[18])
  - Removed 300' minimum following distance for trucks
  - Removed 500' minimum when pulling/towing vehicles in a convoy/caravan

Regarding those two bills, considerations for the ATC include, but are not limited to, all of the following:

- Role of ATC
- Recommendations for implementation and enforcement
- Education
- New administrative rules
- Enforcing reasonable and prudent
- Motor Vehicle regulation
- DOT exemption process
- Plus all the questions raised at the last meeting

To remove barriers and promote safety, the ATC will lead dialogue and advisement of administrative rule changes related to AT and AVs. Successes from other states grappling with the same changes should be a part of any development of recommendations.

OUTCOME The ATC will advise the Iowa DOT and others on administrative rules development as needed.

B. Address Liability & Insurance

Many other impacts from transportation automation need to be addressed by the ATC, many of which are very unclear and constantly evolving. A current example entails facilitating changes occurring with liability and insurance needed to promote widespread benefits as AT proliferates.

The ADS bill mentioned above added a new requirement for financial liability coverage on system-equipped vehicles. This is presumably in addition to conventional liability coverage, but the ATC should work with the Iowa Insurance Division to recommend modifications to insurance requirements.

OUTCOME The ATC will understand how AT affects insurance and liability, assess practices from other states, and coordinate with lead agencies on changes needed.

C. Advise on Legislation

States are advised not to rush into passing laws or establishing new regulations, among five points of advice from The Governors Highway Safety Association:[19]

1. Be informed
2. Be a player in your state
3. Understand the role of states
4. Don't rush laws or regulations
5. Be flexible – this is a new game

17. https://www.legis.iowa.gov/legislation/BillBook?ga=88&ba=SF 302
18. https://www.legis.iowa.gov/legislation/BillBook?ga=88&ba=HF 387
19. https://www.ghsa.org/sites/default/files/2017-01/AV%202017%20-%20FINAL.pdf

It is critically important to be thoroughly informed prior to changes to laws or rules, and being informed through ongoing education is a key crosscutting pursuit of the ATC. In principle, the ATC is the body in Iowa expected to be most informed as recommendations and guidance are issued. The ATC will suggest, assess, or advise on legislative changes, as warranted, for the Iowa Legislature, beginning with the 2020 session in the first four months of 2020.

OUTCOME The ATC will suggest legislative changes, assess pending legislation, and offer advice and consult on AT-related legislation.

D. Policymaker Outreach

With the communication, outreach, and education area, policy-specific outreach should be an ongoing effort of the ATC. This may include targeted outreach to specific individuals, encouraging high level officials to visit the University of Iowa facilities, developing web-based or hard copy outreach material, etc. The ATC should strive to be the focal point for stakeholder deliberation on legislation, policy, and rules as they occur, which will entail increased communication the first four months of each year when the Legislature is most active.

OUTCOME Policymakers throughout Iowa at all levels of government are informed about AT and anticipated impacts on Iowa.

E. Community Readiness

The ATC should position itself to offer guidance to local government within Iowa, even if it initially consists only of compiling resources and connecting local officials with best practice guidance. The ATC should promote incorporation of AT considerations into policy and planning procedures and documents throughout Iowa. Elements of providing education and support to cities and MPOs on AT readiness may also include understanding timelines, implications for long-range plans, alignment with policies, protecting VRUs, and equity, i.e., meeting the accessibility needs of underserved populations.

This is related to infrastructure readiness outcome, particularly of the nature espoused by the NLC. Well maintained assets benefit not only AVs but all road users, so a critical part of Community Readiness is ensuring policy and planning supports basic asset management.

For reference here are two other new resources in mid-2019 that are especially relevant to local governments and community readiness:

- National Association of City Transportation Officials (NACTO), Blueprint for Autonomous Urbanism.[20] This contains a wealth of people-centric policy and design recommendations, emphasizing community safety, mobility, accessibility, and equity for all users.
- National Association of Counties (NACo), Connected and Automated Vehicles Toolkit.[21] This is an introductory web resource that should have broad appeal for local policymakers unfamiliar with connected/cooperative and automated transportation. It references the Johnson County (Iowa) 2014 resolution encouraging AVs on county roads.

OUTCOME Local governments in Iowa know about the ATC, can reach out for guidance on planning for AT, and will be better prepared for AT.

20. NACTO Blueprint: https://nacto.org/publication/bau2/
21. NACo Toolkit: https://www.naco.org/resources/featured/connected-autonomous-vehicles-toolkit

4.2.3. Economic Development

The economic development area of the ATC strives to maximize value by supporting the Iowa economy and businesses and addressing barriers to AT proliferation. The Iowa Economic Development Authority (IEDA) has a key role in this area. The Iowa economy benefits from automated transportation through two primary pathways.

- First, the direct economic and societal benefits to road users and other consumers of the technology. Improved safety and mobility translates into secondary and indirect positive economic impact. To the extent that the economic development efforts lead to improved safety and mobility, this will have multiplicative benefits for the Iowa economy.
- Second, broad economic benefit arises from industrial productivity, Iowa technology developers and businesses advancing automated transportation, and new or growing economic activity related to automated transportation.

A. Outreach to Business

The ATC should engage Iowa industry and specific companies for dialogue, education, and understanding needs. This is an area where consistent messaging is especially important, and this should weave with the Communication, Outreach, & Education area of the ATC. Industry outreach may include manufacturing, tech companies or startups, agriculture, logistics, or other Iowa corporations. The ATC should strive to learn what the ATC can do to help them, whether related to workforce, collaboration, removing barriers, or other issues. The outreach should result in at least three things:

1) Establishing lines of communication for ongoing dialogue, beyond speculation, about real AT opportunities,
2) Increasing Iowa businesses' awareness of AT in Iowa, the ATC, and what the ATC and DOT may be able to help with, and
3) The ATC has better understanding industry needs related to AT, e.g., related to workforce, removing barriers, collaboration, or other issues.

OUTCOME

The ATC and Iowa corporations are engaged in ongoing dialogue and mutual efforts toward advancing AT and achieving its benefits for the Iowa economy.

B. Foster Business Growth

The AT-related legislation passing in early 2019 already has catalyzed better awareness from existing and emerging Iowa businesses with an interest in automation. There exists opportunities for Iowa to attract and grow business related to AT, encourage new entrepreneurship within the industry, and remove barriers to manufacturing and logistics growth. With proactive engagement, the ATC and the Economic Development subcommittee is better positioned to maximize business growth opportunities.

OUTCOME

The ATC is a resource for existing and potential Iowa companies seeking to grow their AT-related business.

C. Improve Freight Movement

Logistics and freight movement are especially well positioned to benefit from AT in Iowa. Efforts in this area will consider current laws and regulations, anticipated AT timelines, the market-driven interests of industry, public safety, and transport efficiency. This may address infrastructure support, workforce needs (shortages, training), adapting logistics to AT, intermodal terminal operations, first-mile/last-mile freight movement, or other freight-related opportunities.

Truck platooning is an example of how benefits can be realized. It received a major step forward with the 2019 legislation that modified minimum following

distance requirements. The ATC should encourage a freight movement pilot or demonstration project, in collaboration with the Iowa DOT, neighboring states, academic partners, the State Patrol and other law enforcement, the Iowa Motor Truck Association (MTA), and one or more trucking, shipping, and/or logistics companies.

OUTCOME The ATC fosters learning and awareness of automated freight movement technology, encouraging AT-enabled advances in freight and logistics.

D. Workforce Development

Separate from transportation agency staff, the ATC can foster economic development by encouraging broad workforce development in AT-related areas needed by Iowa businesses. For instance, programs at the community college level can build workforce knowledge, skills, and abilities (KSAs) in areas of greatest need as AT proliferates. Such areas include computer science, sensor technologies, artificial intelligence, machine learning, signal processing, decision algorithms, human-machine interfaces, and servicing and maintaining CAVs or fleet vehicles equipped with specialized technologies.

OUTCOME The ATC will engage with and promote workforce development for Iowa businesses in AT-related areas of need, in collaboration with educational institutions.

4.2.4. Public Safety & Enforcement

This objective area emphasizes minimizing safety risk to law enforcement, first responders, and other road users, including pedestrians, bicyclists, and other VRUs. The ATC will interface with the law enforcement and first responder community to address issues or procedures related to AV technologies.

A. Adapt to Changing Laws

As laws and administrative rules will continue to change with AT proliferation, all stakeholders will need to adapt as necessary, including public road users, truckers, incident responders, and law enforcement.

A current example arises with the removal of minimum following distances as of July 1, 2019. This puts greater pressure on “reasonable and prudent” following distances and the desire for consistent understanding and application, as well as determining probable cause for stops. The ATC and the Public Safety & Enforcement subcommittee may look to other states for best practices for adjusting to these changes. And this will include educating stakeholders, including law enforcement and the trucking community.

OUTCOME The ATC is the focal point for deliberation on adjustments needed by stakeholders to accommodate changing laws or rules related to AT and safety for all users

B. Explore Vehicle Automation Indications

Related to enforcement but specific enough to separate as its own pursuit is addressing whether and how to include indications on automated vehicles. Law enforcement and other road users have a vested interest in knowing whether another vehicle is automated. The ATC should lead the exploration of Iowa guidance for automated vehicle indicators, subject to national regulation and guidance to avoid introducing any patchwork for regulation.

Possible indicators may be a decal on license plates or an external human-machine interface (eHMI). Indicators may be static for vehicles with automation capability, or dynamic to indicate the active control by an automated driving system (ADS). The ATC may look to international best practice for eHMI on automated vehicles. Distinct from ADS-enabled vehicles are trucks equipped for cooperative

platooning, which also may benefit enforcement and other road users by alerting to electronic tethering when active.

OUTCOME The ATC leads exploration into guidance for external vehicle indicators on ADS-equipped or platoon-capable vehicles.

C. Promote Crash Data & Investigation

As crashes inevitably occur involving vehicles operating under different levels of automation, there exist a great deal of data that can aid in specific investigations, as well as general understanding of safety implications of AVs. These data captured in vehicles are largely proprietary, but the ATC should press for certain data types that should be made available as part of crash reports (the states Traffic and Criminal Software, or TraCS) or through investigations seeking data from the on board electronic control unit (ECU), event data recorder (EDR), or other vehicle systems.

The ATC should investigate what additional data are – or should be – available to law enforcement, the Motor Vehicle Division, as well as what subset can be made available to the engineering and research stakeholders. Investigators will need to be educated – and work to educate others – on warrants and other legal mechanisms for obtaining data from AVs.

In addition data related to crashes, the ATC should pursue data on near misses, disengagements, or other circumstances relevant to AV safety. This will include examining what characteristics may or may not be available with the vehicles themselves (e.g., VIN, self-reported by automakers, etc.) and what other states have had success with obtaining from crash and incident data collection.

The University of Iowa is a local resource for this item, providing expertise and national perspective. They are under contract with the National Transportation Safety Board (NTSB) to provide support for training, investigation, and reconstruction for crashes involving partial automation and higher levels of automation.

Another specific tactic that should be pursued is the inclusion of automation in Iowa's TraCS. The current federal Model Minimum Uniform Crash Criteria (MMUCC)[22] recommends an element for motor vehicle automated driving systems, through with law enforcement can capture level of automation and system engagement at the time of the crash.

OUTCOME The ATC knows what data are available from AVs and will recommend what additional data should be captured from crashes.

D. Ensure Safe Incident Management

Emerging CAV technology not only brings potential benefits, but new issues that first responders must adapt to as well. For example, leveraging promising new vehicle technologies like automatic collision notification (ACN) or advanced CAN (AACN) can improve response times, scene management, clearance times, and medical outcomes. On the other hand, AVs will be increasingly electric or hybrid, with large batteries that demand new safety procedures following crashes. Another example is enabling dynamic incident or closure re-routing through real-time traveler information integration with connected vehicles, which of course comes with concerns about exacerbating conditions on alternate routes not suitable for increased traffic.

OUTCOME As AT proliferates, the ATC promotes advances in incident and crash safety technologies and applications, as well as first responder safety.

22. https://www.nhtsa.gov/mmucc

4.2.5. Communication, Outreach, & Education

This is the first of two crosscutting objective areas. The ATC should continuously strive to keep stakeholders, decisionmakers, and the public informed of AT issues and opportunities as technologies continue to evolve and timelines continue to shift. As part of this ongoing, crosscutting effort, the ATC should consider communications, outreach, and education needs at each Council and subcommittee meeting. Stakeholder interests vary widely in transportation as it is, and AV proliferation brings in even more dimensions and interests. The ATC through this crosscutting area must work to stay abreast of emerging issues and ahead of diverse stakeholder needs, and should work to ensure that equity and accessibility improvements are addressed throughout all automation considerations.

OUTCOME The ATC is well-educated on AT and is known to all stakeholders as a resource for information and a conduit for suggestions.

The work in this area entails marketing efforts for automated transportation, and help guide success, a tactical marketing plan should be considered. To aide better understanding among the public and other stakeholders, the ATC should develop forms of outreach material, implement its own branding and online presence, and provide a feedback mechanism for questions, concerns, and suggestions. Developing branding and a website presence has been an interest for the tactical prong since 2018. There is no shortage of ideas and material available, e.g., various federal and non-profit groups, and a potentially helpful new national resource available as of 2019 is the Partners for Automated Vehicle Education (PAVE),[23] a public and industry coalition, including the National Safety Council.

Preparing a response for the eventual serious AV crashes in Iowa is a suggested tactic within this area. When this happens, Iowa's AV regulations, the DOT, and the ATC will all come under scrutiny. The ATC is in a position to help be better prepared through scenario planning and preparation of a media release that can be tailored for the circumstance. The exercise itself will help suss out issues and improve agency knowledge.

4.2.6. Research, Development, Testing, & Evaluation (RDT&E)

Also cross cutting all initiative areas is the objective area of RDT&E. With the Iowa State University, the University of Iowa, and potentially other academic partners, there exists ongoing exploration of technical challenges, new needs for testing environments, and pilots on public roads in mixed fleets.

OUTCOME The ATC its stakeholders learn from and advance AT in Iowa by directing and coordinating AT efforts related to RDT&E.

4.3. Resources & Funding

A central part of the programmatic prong is the identification of resources, in the form of people, time, or money. The six objective areas have been developed into 20 desired outcomes, and achieving those outcomes require resources. Given the nature of the ATC as a largely collaborative and volunteer entity, much of what is to be achieved can be done by leveraging the people and their resources already available. In some cases, additional funds can be put to use for now, or can be used on expanded programs, consultant support on specific tasks, targeted research or development, and pilot or demonstration initiatives.

23. https://pavecampaign.org/

Iowa resources can also be used as non-federal matching funds, which are almost always required for federal grant programs. The ATC should remain aware of these federal funding sources and ready to support stakeholder's applying for them. Examples of current federal grant programs – some of which Iowa stakeholders have already applied to – include:

- Infrastructure for Rebuilding America (INFRA, formerly FASTLANE)[24]
- Better Utilizing Investments to Leverage Development (BUILD, formerly TIGER) Discretionary Grant Program[25]
- Advanced Transportation & Congestion Management Technologies (ATCMTD)[26]
- State Transportation Innovation Council (STIC) Incentive Program[27]
- Automated Driving System (ADS) Demonstration Grants[28]
- Every Day Counts[29]
- Accelerated Innovation Deployment Program[30]

An example of an outcome pursuit that will involve current stakeholders and their volunteer(ed) resources is adapting to changing laws and rules (under Policy & Legislation), which entails adjusting detailed internal policies and practices or communicating changes with stakeholders. Vehicle indicators (under Public Safety & Enforcement) is an example of an outcome pursuit that may benefit from new funding. It may include funding research with an academic partner for a best practices scan, evaluation of eHMI strategies and technologies, and development of a pilot and guidance.

The private sector should never be overlooked for collaborative opportunities to advance an effort. An example of an outcome pursuit of this nature is a truck platooning demonstration (in Economic Development). This is subject to clarifying regulations for platooning and will involve resources from the Iowa DOT, State Patrol, university partners, and the private sector providing the technology and vehicles.

24. https://www.transportation.gov/buildamerica/infragrants
25. https://www.transportation.gov/BUILDgrants
26. https://www.fhwa.dot.gov/fastact/factsheets/advtranscongmgmtfs.cfm
27. https://www.fhwa.dot.gov/innovation/stic/guidance.cfm
28. https://www.transportation.gov/av/grants
29. https://www.fhwa.dot.gov/innovation/everydaycounts/
30. https://www.fhwa.dot.gov/innovation/grants/

5. TACTICAL INITIATIVES

Third and final is the tactical prong. Herein lies the specific tactics, services, actions, activities, projects, etc. that are to be done toward achieving the 20 desired outcomes described above. Achieving those outcomes in turn address the six objective areas, which in turn are tied to the stated ATC goals, as well as the mission, vision, and the purpose statement.

Expect the details within the tactical prong to regularly evolve as the Council and its subcommittees continue to meet, and as the technology continues to shift. No attempt is made to capture all of those details here nor attach specific budgets or timelines, instead refer to the subcommittee meetings themselves, the meeting notes, the updates and deliberation occurring at each full Council meeting, or via myriad efforts and communications continuously occurring in parallel.

5.1 Infrastructure Readiness

The following items will help fill in the preparedness roadmap for physical, digital, and institutional infrastructure, supporting movement toward the five desired outcomes for Infrastructure Readiness presented in the previous section. Accomplishments in this area support drivers today while supporting ADS tomorrow.

1. **Assess & Advance AT Readiness** – fund and execute a statewide assessment of infrastructure, traffic control assets, communications (coverage, speed, and security), electric vehicle (EV) support, connectivity, information technology (IT) capabilities, etc.
    - This must align with the CAT SLP, should look to national (e.g., National Strategy for Highway Automation, National Highway Automation ConOps) and international guidance, should culminate with gap identification and an improvement plan, and may incorporate CAT CMM/CMF
2. **Improve Pavement Marking** – inventory pavement marking, develop and implement policy for improving visibility and upgrading to 6-inch standard, including development of criteria for identifying and prioritizing corridors for upgrade, e.g., based on freight network, traffic volumes, roadway classification, crashes, etc.
3. **Build Out Fiber Backbone** – supporting needed communications infrastructure for CAV operations, fund and execute recommendations in Iowa DOT's ITS & Communications SLP, collaborate with the Iowa Communications Network (ICN), explore public-private partnerships, and ensure alignment with the Governor's broadband initiative
4. **Implement Pilot Program** – develop and fund a program (Iowa CAT Challenge) to support AT innovation, advancement, and trials in Iowa; issue a challenge (via request for proposals) to bring emerging technologies forward more deliberately and quickly
    - This item is also noted below under Policy & Legislation and Economic Development
5. **Define Data Systems Architecture** – to prepare for more and new types of data while ensuring performance, security, and privacy; develop plan for AT-related data management in concert with DOT's IT and ITS architectures

5.2 Policy & Legislation

1. **Bolster State Leadership** – be proactive in keeping Iowa leadership informed about AT opportunities and needed efforts through targeted engagement with agency leadership, legislative committees, and non-profit advocacy associations

2. **Monitor Legislation** – stay abreast of new legislation needs, and as new legislation is considered, the Policy & Legislation subcommittee should assess and comment as appropriate; keep aware of legislative, legal, and regulatory developments occurring in all neighboring states

3. **Modify Administrative Rules** – actively underway in 2019 following May 2019 CAT legislation (HF387 regarding following distances and SF302 addressing ADS), and potentially an ongoing effort following legislation, regulatory changes, and shifting technology

4. **Ensure CAT in Planning** – both at the local and state levels, ensure CAT is considered in relevant policy, planning, and programming processes and documents

5. **Improve Equity & Accessibility** – as an essential component of community readiness, leverage best practices from national guidance and peer jurisdictions to ensure that underserved populations gain improved access to transportation and mobility from not only automation, but from related trends in the sharing economy, mobility as a service (MaaS), and mobility on demand (MoD)
    - This must also include stakeholder outreach as noted below under Communication, Outreach, & Education

6. **Implement Pilot Program** – duplicated here from Infrastructure Readiness above because this necessarily entails engagement across agencies and with the legislature

5.3 Economic Development

As presented in the previous section, the four identified economic development outcomes are improved through greater industrial productivity and economic and societal benefits from improved transportation.

1. **Assess Platooning Corridors** – recognizing that truck platooning is only suitable on certain routes and segments, in collaboration with Iowa State Patrol, Motor Vehicle Enforcement, and the Systems Planning Bureau, and in coordination with the CAT SLP
    - Research and develop roadway characteristics or attributes most amenable to platooning, as well as risks to infrastructure and other uses; then perform system screening; determine best approach for designating corridors for truck platooning, integrating with the State Freight Plan, and considering regulatory and enforcement steps

2. **Initiate Platooning Study** – to assess benefits to Iowa, risks (e.g., to infrastructure) and opportunities, regulatory and enforcement issues, jurisdictional barriers, etc.

3. **Engage with Iowa Businesses** – reach out to Iowa companies for ongoing dialogue for advancing AT, solicit innovations, explore public-private partnerships, etc., with stakeholder engagement (ISP, MVE, IMTA, and others) during concept exploration

4. **Engage with Iowa Community Colleges** – in support of workforce development, education and training initiatives, reach out to the Iowa

31. https://iowadot.gov/iowainmotion/specialized-system-plans/state-freight-plan

(IACCT) and related businesses and non-profit advocates in support of capacity building for post-secondary technical education

5. **Implement Pilot Program** – duplicated here from Infrastructure Readiness above because this also promotes both industry growth and public benefits

5.4 Public Safety & Enforcement

With safety for all users of paramount importance, the four desired outcomes defined in the previous section are improved through the following activities.

1. **Develop Following Distance Guidelines** – under the leadership of the Iowa State Patrol and Motor Vehicle Enforcement, develop procedures for enforcing reasonable and prudent following distances, and communicate to law enforcement and trucking community statewide

2. **Explore Vehicle Automation Indications** – ensure Iowa is engaged with national (e.g., AAMVA) best practices for vehicle automation indicators or external human machine interfaces (eHMI); encourage and support consistent, nationwide standards

3. **Capture AV Crash Data** – explore data unique to AVs as well as the Model Minimum Uniform Crash Criteria (MMUCC, 5th Ed, 2017) recommendation for ADS data capture from crashes, given necessary data systems changes and the need for crash form changes

4. **Inform TIM & Safety Community** – include ATC representation on the Statewide Traffic Incident Management (TIM) Committee for ongoing coordination; develop and deliver an outreach presentation, emphasizing AT considerations specific to traffic safety, incident response, and responder safety, for the TIM Committee, Multidisciplinary Safety Team (MDST), and potentially other TIM and traffic safety stakeholder groups

5. **Address VRU Safety** - explicitly consider AV risks to VRUs and mitigating strategies in the next Iowa DOT SHSP update.

5.5 Communication, Outreach, & Education

As a crosscutting area, these activities are threaded throughout the other areas.

1. **Active Coordination** – across Council and subcommittees, with at least one communications professional on each subcommittee and attending each meeting
    - Communications members meet as a group to discuss needs and develop work plans; include a communications agenda item during each Council meeting, to report, make or receive requests, and obtain consensus on decision items and critical messaging
2. **Public Outreach** – to engage public and other stakeholders through web, print, presentations at conferences, special events, etc.
    - Develop and maintain ATC branding, including color scheme and text formatting; for website, select and obtain an address, develop layout and maintain content
    - The tactic on equity listed above under Policy & Legislation is more impactful with outreach to stakeholder organizations representing populations currently underserved by transportation or potentially facing greater barriers with automation
3. **Response Planning** - development of a communications plan for response to eventual major automated vehicle crashes or incidents involved transportation automation

5.6 Research, Development, Testing, & Evaluation

The crosscutting area of Research, Development, Testing, & Evaluation (RDT&E) already touches on many of the tactical items listed above.

1. **RDT&E Coordination** – university stakeholders are included on each subcommittee and expected to participate in each meeting
2. **RDT&E Engagement** – the Iowa ADS demonstration grant awarded in September 2019 is a prominent project that ties closely to ATC goals and objectives; those leading the project are encouraged to keep the ATC engaged

6. SUMMARY & NEXT STEPS

This Iowa AT Vision has documented the ATC's progress in 2019 from its formative concepts through strategy refinement to tactical recommendations. The following table summarizes the emphasis areas developed through the planning process and documented herein. The objective areas are the six items capturing Iowa's overall AT strategy; the outcomes summarize the objectives and desired outcomes to pursue, as described in Section 4; and the tactics are the actions and initiatives outlined in Section 5.

Table 2. Summary of Objectives and Tactics

Objective Areas	Outcomes	Tactics
Infrastructure Readiness	A. Accelerate Infrastructure Readiness B. Implement National Guidance C. Improve Traffic Control Assets D. Leverage Communications Infrastructure E. Develop Agency Workforce	1. Assess & Advance AT Readiness 2. Improve Pavement Marking 3. Build Out Fiber Backbone 4. Implement Pilot Program* 5. Define Data Systems Architecture
Policy & Legislation	A. Evolve Administrative Rules B. Address Liability & Insurance C. Advise on Legislation D. Policymaker Outreach E. Community Readiness	1. Bolster State Leadership 2. Monitor Legislation 3. Modify Administrative Rules 4. Ensure CAT in Planning 5. Improve Equity & Accessibility 6. Implement Pilot Program*
Economic Development	A. Outreach to Business B. Foster Business Growth C. Improve Freight Movement D. Workforce Development	1. Assess Platooning Corridors 2. Initiate Platooning Study 3. Engage with Iowa Businesses 4. Engage with Iowa Community Colleges 5. Implement Pilot Program*
Public Safety & Enforcement	A. Adapt to Changing Laws B. Explore Vehicle Automation Indications C. Promote Crash Data & Investigation D. Ensure Safe Incident Management	1. Develop Following Distance Guidelines 2. Explore Vehicle Automation Indications 3. Capture AV Crash Data 4. Inform TIM & Safety Community 5. Address VRU Safety
Communications, Outreach, & Education	Crosscutting	1. Active Coordination 2. Public Outreach 3. Response Planning
Research, Development, Testing, & Evaluation	Crosscutting	1. RDT&E Coordination 2. RDT&E Engagement

* the pilot program is intentionally repeated in three areas

The formulated tactics and their descriptions were circulated for review ahead of the November 2019 joint subcommittee meetings, and during each meeting, all participants had the opportunity to weigh in with their priorities using an online interactive ranking tool. The results of these exercises are summarized in the following two figures. Note the VRU tactic under Public Safety & Enforcement was introduced later and does not appear here.

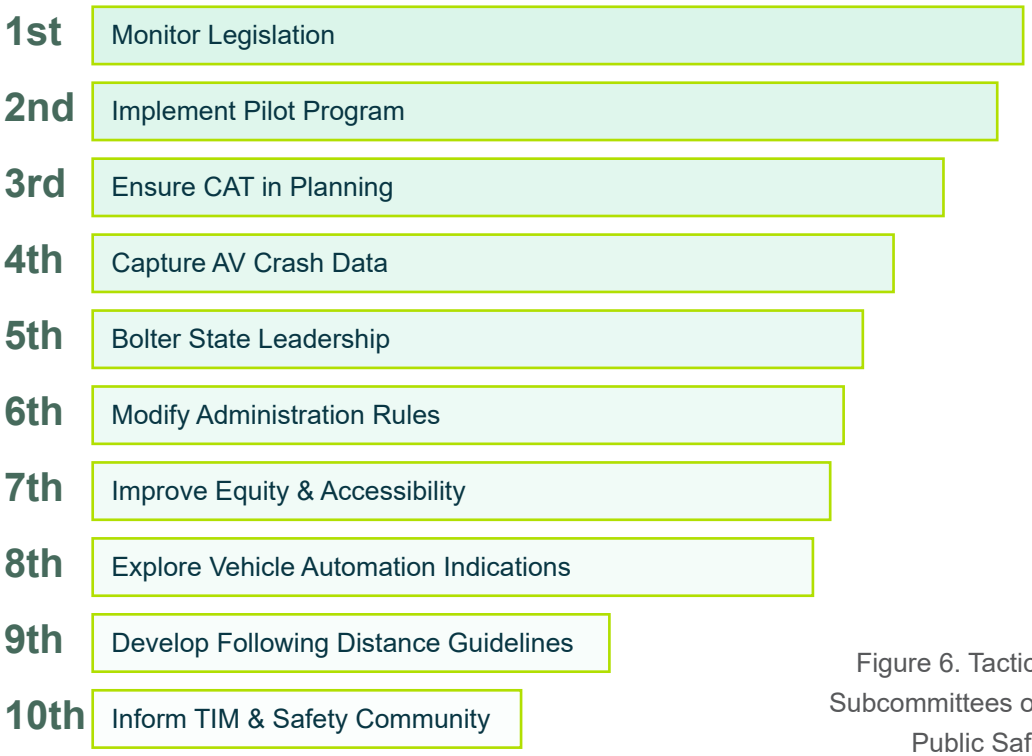


Figure 6. Tactics Prioritization for Joint Subcommittees of Policy & Legislation and Public Safety & Enforcement

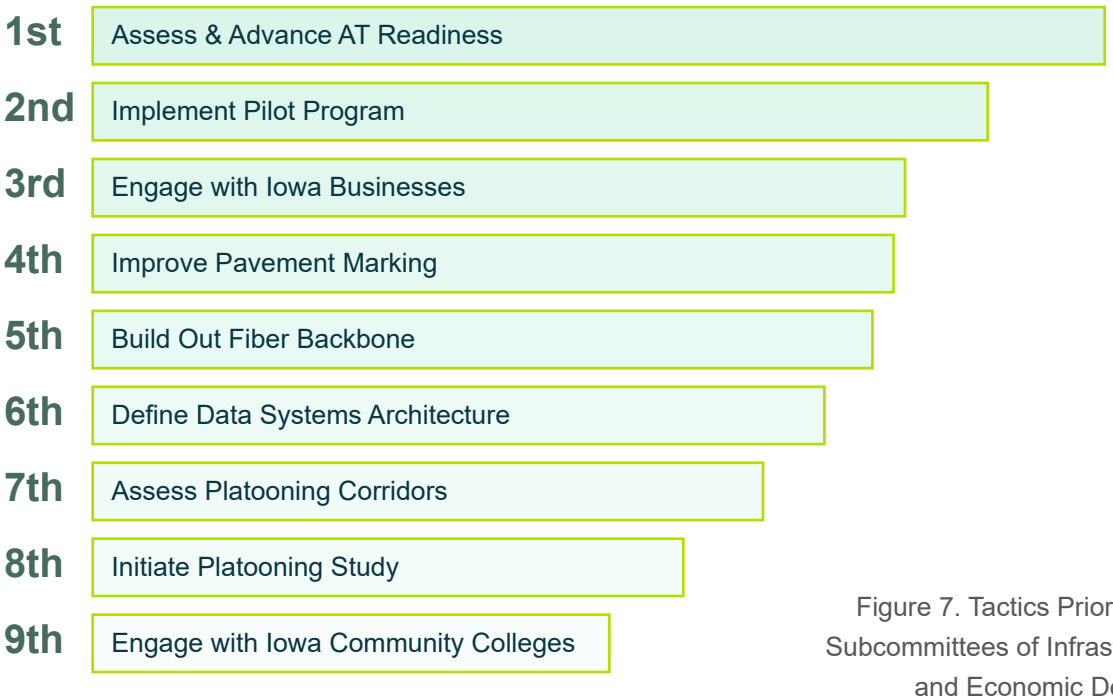


Figure 7. Tactics Prioritization for Joint Subcommittees of Infrastructure Readiness and Economic Development

The tactics widely vary in their level of effort, and the feedback is not scientific; nonetheless the priorities highlighted in each of the four objective areas are:

- **Infrastructure Readiness:** clearly the assessment of AT readiness is a top priority, followed by the CAT Challenge (which spans three areas);
- **Policy & Legislation:** attending to legislation remains a top priority, with the advancement of the CAT Challenge, followed by better planning for CAT;
- **Economic Development:** here the CAT Challenge is top priority, followed by better engagement with Iowa businesses; and
- **Public Safety & Enforcement:** improving the capture of AV data is a top priority, with the exploration into external AV indicators coming second.

6.1 Automated Transportation in 2020 and Beyond

Given the varied and collaborative nature of the ATC membership and related stakeholders, the document intentionally does not prescribe responsibilities and timelines. While there are acknowledged limitations in not explicitly documenting accountability for executing tactics in pursuit of the well-formulated desired outcomes captured in this document, Iowa has a strong and supportive culture of adopting innovation toward improving safety and mobility. Furthermore, the substantial momentum that has gathered in 2019 through the ATC planning and vision work will continue to propel stakeholders.

With the set of outcomes and priority tactics firmly kept in mind – some already underway – a key recommendation for the Council is to direct each of the six objective area leads to spearhead the development of a brief but specific work plan for the four subcommittees and two cross-cutting work groups. The Communication, Outreach, & Education group has already started embarking on this. The work plans must be allowed to evolve as so much can shift, but each should address the following five items:

1. Tactical priorities, the services, activities, or projects underway or needing to be initiated;
2. Roles and responsibilities, identifying the agency or organization leads or champions taking on accountability for implementation;
3. Resourcing, how, and by whom, which goes back to an inherent challenge of the programmatic prong with a diverse volunteer effort;
4. Scenario planning, given the uncertainty surrounding resources, regulation, and the technology itself, include consideration of multiple possible eventualities; and
5. Timelines, for additional accountability but bolstered by the growing momentum and interest in getting to the benefits sooner than later.

> What is accomplished next is directed by the ATC.

The Iowa ATC and DOT will continue their leadership roles in implementing AT in Iowa today and preparing to leverage the benefits of AT advancements as they evolve tomorrow. The ATC as the focal point of diverse stakeholders will strive to execute this Iowa AT Vision to "**increase roadway safety, personal mobility, and freight movement within the state of Iowa.**"

APPENDIX A ACRONYMS

AADT	Average Annual Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ACAT	Advanced Collision Avoidance Technology
ADS	Automated Driving System
AI	Artificial Intelligence
ARC-IT	Architecture Reference for Cooperative and Intelligent Transportation
AT	Automated Transportation
ATDM	Active Transportation and Demand Management
ATM	Active Traffic Management
ATMS	Advanced Traffic (or Transportation) Management System
AV	Automated Vehicle
AVL	Automated Vehicle Location
CACC	Cooperative Adaptive Cruise Control
CAD	Computer Aided Dispatch
CAT	Connected (or Cooperative) and/or Automated Transportation
CAV	Connected (or Cooperative) and/or Automated Vehicle (also C/AV or CV/AV)
CCTV	Closed Circuit Television
CFR	Code of Federal Regulations
CMM	Capability Maturity Model
COG	Continuity of Government
COOP	Continuity of Operations
CTRE	Center for Transportation Research and Education (Iowa State Univ.)
CV	Connected (or Commercial) Vehicle
CVO	Commercial Vehicle Operation
DAS	Department of Administrative Services
DDS	Data Distribution System
DHS	United States Department of Homeland Security
DMS	Dynamic Message Sign
DOT	Department of Transportation
DPS	Department of Public Safety
DSRC	Dedicated Short Range Communication
eHMI	External Human-Machine Interface
EM	Emergency Management
EMS	Emergency Medical Services
EOC	Emergency Operations Center
ESF	Emergency Support Function
ESS	Environmental Sensor Station
EV	Electric Vehicle
FAST	Fixing America's Surface Transportation
FCC	Federal Communications Commission
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FSP	Freeway Service Patrol
GIS	Geographic Information System
GPS	Global Positioning System
GTSB	Governor’s Traffic Safety Bureau
HAR	Highway Advisory Radio
HAV	Highly Automated Vehicle
HMI	Human-Machine Interface
HSEMD	Homeland Security and Emergency Management Department
I2V	Infrastructure to Vehicle
ICE	Interstate Condition Evaluation
ICE-Ops	Interstate Condition Evaluation for Operations
ICS	Incident Command System
IEEE	Institute of Electrical and Electronics Engineers

IMT	Incident Management Team
IMTA	Iowa Motor Truck Association
InTrans	Institute of Transportation (Iowa State Univ.)
ISICSB	Iowa Statewide Interoperable Communications System Board
ISP	Iowa State Patrol
IT	Information Technology
ITS	Intelligent Transportation Systems
JDF	Joint Dispatch Facility
MAASTO	Mid America Association of State Transportation Officials
MCHAR	Multistate Collaborative on Highway Automation Readiness
MDST	Multi-Disciplinary Safety Team
MMS	Multimedia Message Service
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
MVD	Motor Vehicle Division
MVE	Motor Vehicle Enforcement
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
NIMS	National Incident Management System
NTCIP	National Transportation Communications for ITS Protocol
NUG	National Unified Goal (for TIM)
OBU	Onboard Unit
ODOT	Ohio Department of Transportation
OEM	Original Equipment Manufacturer
PSAP	Public Service Answering Point
RDT&E	Research, Development, Testing, and Evaluation
RSU	Roadside Unit
RTSMIP	Real-Time System Management Information Program
RWIS	Road Weather Information System
SAE	Society of Automotive Engineers
SCMS	Security and Credentials Management System
SE	Systems Engineering
SEA	Systems Engineering Analysis
SEOC	Statewide Emergency Operations Center
SHRP2	2nd Strategic Highway Research Program
SHSP	Strategic Highway Safety Plan
SITREP	Situational Report
SLP	Service Layer Plan (TSMO)
SMS	Short Message Service
SOP	Standard Operating Procedure
TAM	Transportation Asset Management
TIM	Traffic Incident Management
TMC	Traffic Management Center
TMDD	Traffic Management Data Dictionary
TRB	Transportation Research Board
TSMO	Transportation Systems Management and Operations
UAS	Unmanned Aerial System
UAV	Unmanned Aerial Vehicle
USDOT	United States Department of Transportation
V2I	Vehicle to Infrastructure
V2V	Vehicle to Vehicle
V2X	Vehicle to anything
VMT	Vehicle Miles Traveled
VIN	Vehicle Identification Number
VRU	Vulnerable Road User
VSL	Variable Speed Limit

APPENDIX B ATC MEETING LOG

Table 3. AT Council and Subcommittee Meetings

Meeting	Date	Note
Full Council	Tue 7/17/18	Initial kick-off, reviewed draft charter, eliciting feedback, soliciting participation
Infrastructure Subcommittee	Mon 11/19/18	First meeting
Policy & Legislation Subcommittee	Tue 11/20/18	First meeting
Safety Subcommittee	Tue 11/20/18	First meeting
Communications & Education Subcommittee	Mon 11/26/18	First meeting
Economic Development Subcommittee	Wed 11/28/18	First meeting
Full Council	Thr 11/29/18	Background education, general discussion
Demo Day	Mon 1/7/19	NADS tour open to all
Full Council	Fri 3/29/19	Peloton presentation, began AT planning effort described in this document
Economic Development Subcommittee	Mon 5/6/19	Working through objectives and developing outcomes; theme of “maximizing value”
Policy & Legislation Subcommittee	Tue 5/21/19	Working through objectives and developing outcomes; deliberation on recent legislation
Public Safety & Enforcement Subcommittee	Thr 6/6/19	Working through objectives and developing outcomes; adjusting to new legislation
Infrastructure Readiness Subcommittee	Mon 6/10/19	Working through objectives and developing outcomes; Des Moines Smart City and CAT SLP
Full Council	Wed 6/12/19	Consensus to revise subcommittee structure
Policy & Legislation Subcommittee	Tue 7/30/19	Confirmed outcome pursuits, embarking on tactics; insurance presentation
Economic Development Subcommittee	Wed 8/7/19	Confirmed outcome pursuits, engaged industry, embarking on tactics
Public Safety & Enforcement Subcommittee	Thr 8/15/19	Confirmed outcome pursuits, deliberated on terminology, embarking on tactics
Infrastructure Readiness Subcommittee	Tue 8/27/19	Confirmed outcome pursuits, discussed digital infrastructure, embarking on tactics
Full Council	Thr 9/12/19	Discussed outreach, news of Iowa’s ADS grant award, presentation on insurance

Table 3. AT Council and Subcommittee Meetings

Meeting	Date	Note
Policy & Legislation Subcommittee	Tue 11/12/19	Combined with Public Safety & Enforcement
Public Safety & Enforcement Subcommittee	Tue 11/12/19	Combined with Policy & Legislation
Economic Development Subcommittee	Tue 11/19/19	Combined with Infrastructure Readiness
Infrastructure Readiness Subcommittee	Tue 11/19/19	Combined with Economic Development
Full Council	Wed 12/4/19	
		(2020 meetings continue)

Meetings are continuing in 2020, likely shifting to thrice-yearly instead of quarterly. Meetings of other subcommittees shown in an earlier version of the ATC charter never occurred. These are Freight & Commerce, Manufacturing & Industry, and Liability & Finance. The organization of topics among subcommittees was refined through this project, and the ATC adopted the subcommittee structure shown in this document at its June 2019 meeting.

APPENDIX C ATC CHARTER

The ATC Charter is appended on the following pages for reference.

CHARTER

IOWA'S ADVISORY COUNCIL ON AUTOMATED TRANSPORTATION

IOWA ADVISORY COUNCIL ON AUTOMATED TRANSPORTATION

IOWADOT

Iowa Advisory Council on Automated Transportation

Iowa Department of Transportation

March 2020

1. PURPOSE

The Iowa Advisory Council on Automated Transportation (ATC) is intended to increase roadway safety, personal mobility, and freight movement within the state of Iowa by advancing highly automated vehicle technologies. The Council shall provide guidance, recommendations, and strategic oversight of automated transportation activities in the state.

Vision Statement

To create an AV-ready driving environment in Iowa for the safe movement of people and freight for a thriving Iowa economy.

Mission Statement

Lead, coordinate, and enable the advancement of automated transportation systems in Iowa

2. STRATEGIC GOALS

The Council will focus on the following strategic goals:

- Function as a catalyst and forum for automated transportation systems and automated vehicle (AV) technologies
- Discuss policy and strategies to further effective and successful research, development, testing, operation, and implementation of AVs in the state of Iowa
- Provide coordinated feedback on AVs to both public and private entities
- Promote testing and deployment and remove barriers
- Provide a forum for education and outreach on automated transportation systems and AVs

Fulfillment of the Council's strategic goals will benefit all travelers in several ways:

- Improved cooperation and collaboration among partners regarding automated transportation, thereby better serving the public
- Expedited policy and resource alignment, improved transportation mobility, and a thriving economy
- Fewer crashes and safer highways for all Iowans and travelers

3. MEMBERSHIP & GOVERNANCE

The Iowa DOT serves as the lead chair. The University of Iowa serves as a Co-Chair for management and logistics. In addition, the University of Iowa provides expertise in vehicle safety, policy, and education around AV technologies. Iowa State University provides expertise on transportation infrastructure and operations. The following table shows membership as of March 5, 2020.

Council Seat/Focus	Department/Organization	Member	Email
1. Chair	Iowa Department of Transportation	Scott Marler, Iowa DOT Director	scott.marler@iowadot.us
2. Public Safety	Iowa Department of Public Safety	Stephan Bayens, Commissioner	bayens@dps.state.ia.us
3. Public Safety	Iowa State Patrol	Jeff N. Ritzman, Colonel Chief	ritzman@dps.state.ia.us
4. Economic Development	Iowa Economic Development Authority	Debi Durham, Director (Delegate: Rick Peterson)	debi.durham@iowaeda.com rick.peterson@iowaeda.com
5. Economic Development	Iowa City Area Chamber of Commerce	Jennifer Banta, Vice-President for Advocacy & External Affairs	jennifer@iowacityarea.com
6. Economic Development	Technology Association of Iowa (TAI)	Brian Waller, Director	brian.waller@technologyiowa.org
7. Insurance	Iowa Insurance Division	Doug Ommen, Commissioner (Delegates: Jared Kirby, Travis Grassel)	doug.ommen@iid.iowa.gov jared.kirby@iid.iowa.gov travis.grassel@iid.iowa.gov
8. Freight/Commerce	Iowa Motor Trucking Association	Brenda Neville, Director (Delegate: Don Egli)	brenda@iowamotortruck.com don@iowamotortruck.com
9. Freight/Commerce	Freight Advisory Council	Mike Steenhoek, Chair	msteenhoek@soytransportation.org
10. Local Government	Iowa League of Cities	Alan Kemp, Executive Director (Delegate: Erin Mullenix)	alankemp@iowaleague.org erinmullenix@iowaleague.org
11. Local Government	Iowa State Association of Counties	Shane Walters, ISAC Board	shanew@siouxcounty.org
12. Agricultural/Rural	Department of Agriculture and Land Stewardship	Mike Naig, Director (or delegate)	michael.naig@iowaagriculture.gov
13. Strategic Communications	Iowa Department of Transportation	Andrea Henry, Director, Iowa DOT Strategic Communications & Policy	andrea.henry@iowadot.us
14. Infrastructure	Associated General Contractors of Iowa	Scott Newhard, Vice President for Public Affairs (or delegate)	snewhard@agcia.org
15. Ex Officio	Federal Highway Administration, Iowa Division	John Gibson, Transportation Specialist	johnnie.gibson@dot.gov
16. Ex Officio	Federal Motor Carrier Safety Administration	Shirley McGuire, Division Administrator	shirley.mcguire@dot.gov
17. Ex Officio	National Highway Traffic Safety Administration	Susan deCourcy, Regional Administrator, NHTSA - Region 7	susan.decourcy@dot.gov

4. SUBCOMMITTEES

Four subcommittees, overseen by and reporting to the Council, will provide in-depth resources and insights on topics related the implementation of automated vehicle transportation and technologies. These subcommittees correspond to four of the six objective areas identified in the ATC Vision document.

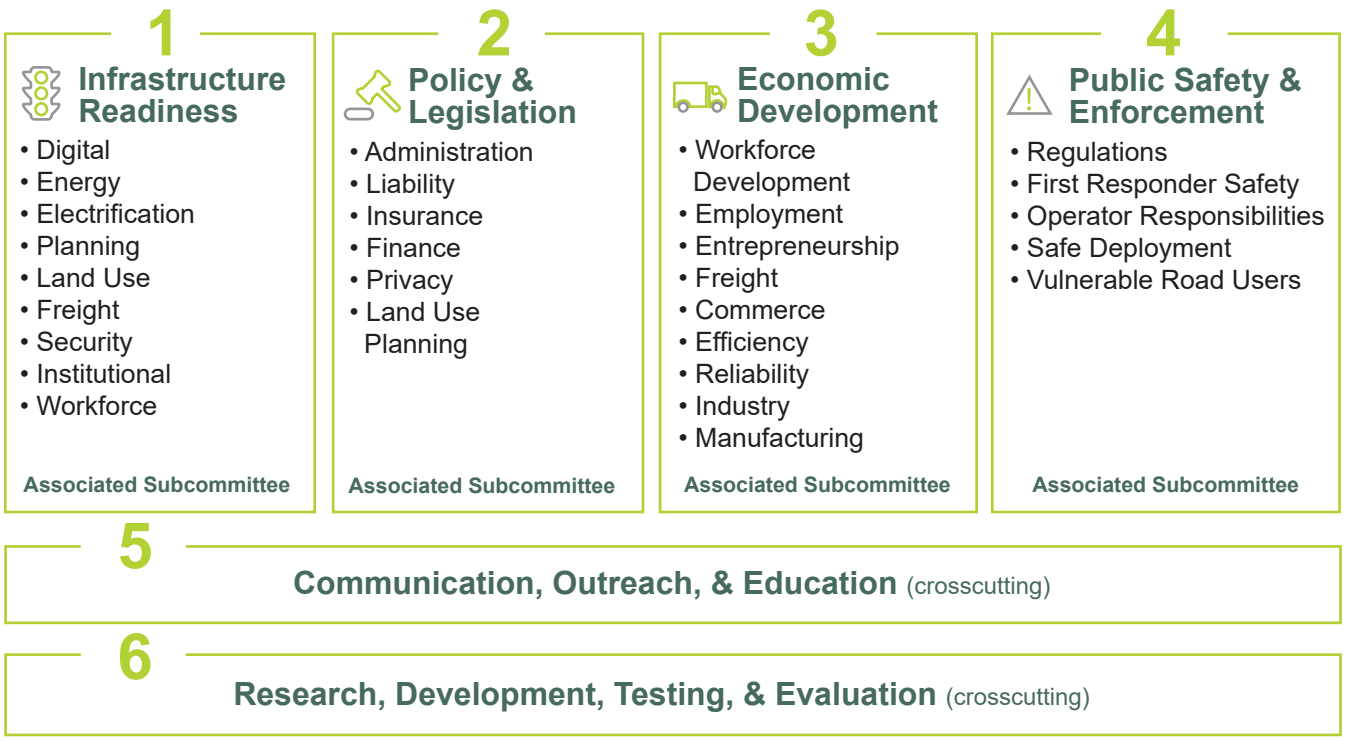
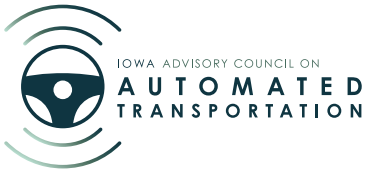


Figure 1 ATC Strategic Objective Areas

5. MEETINGS

Council meetings will be held three times per year. Subcommittee or other additional meetings are scheduled upon request of the Council members. The Council Chair will lead the meetings. The University of Iowa will support all efforts of the meetings, including development of the agenda and minutes. Meetings will be convened at mutually agreeable locations determined by the Chair and members.



Iowa Advisory Council on Automated Transportation

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