



**ADVANCING THE NATIONAL SPATIAL
DATA INFRASTRUCTURE THROUGH
PUBLIC-PRIVATE PARTNERSHIPS AND
OTHER INNOVATIVE PARTNERSHIPS**

A Report of the National Geospatial Advisory Committee
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Table of Contents

1.0 Executive Summary	1
2.0 Introduction	3
2.1 The Subcommittee Task.....	4
2.2 What is a P3?	5
2.3 Why are P3s Important?	6
2.4 So then, what are Other Innovative Partnerships?.....	7
3.0 Approach	7
4.0 Findings	9
4.1 Characteristics of Success	9
4.2 Cautionary Lessons.....	9
4.3 Statutory and Legal Considerations.....	10
4.4 From Innovative Partnerships to P3s.....	12
4.5 Governance.....	13
4.6 Where are P3s most needed?	15
5.0 Recommendations	16

Table of Figures

Figure 1: Public-Private Partnerships: Approaches and Levels of Responsibility for Public and Private Sector Partners	5
Figure 2: Success Characteristics Associated with P3s and Other Innovative Geospatial Partnerships ...	9
Figure 3: Case Study Maturity Assessment	11

Public-Private Partnerships: Advancing the NSDI through P3s and Innovative Partnerships

1.0 Executive Summary

The National Geospatial Advisory Committee (NGAC), in providing recommendations to the government on geospatial policy and programs, continues to underscore the importance of leveraging Public-Private Partnerships (P3s) as a tool to advance the National Spatial Data Infrastructure (NSDI). In addition, the [Geospatial Data Act of 2018](#) (GDA) and the [2021-2024 NSDI Strategic Plan](#) (“NSDI Strategic Plan”) encourage the creation of partnerships by Federal agencies with all levels of government, academia, and the private sector to advance the NSDI.

In 2019, the NGAC formed a subcommittee to investigate the application of P3s and other innovative partnerships as a tool to more effectively leverage the resources of the public and private sectors to advance the NSDI. The subcommittee’s tasks focused on: 1) assessing geospatial data availability and priorities by government/industry, 2) examining case studies of P3s and other innovative cooperative partnerships to identify goals, benefits, and cautionary lessons that can help inform and shape more productive future partnerships, and 3) identifying priority areas of need where P3s and other innovative partnerships should be applied.

The subcommittee examined several US and international geospatially related P3s and other innovative partnerships, and produced summaries identifying the purpose, approach, success factors and challenges of each project. Included in the subcommittee’s review were the:

- Alberta Data Partnerships
- National Geospatial-Intelligence Agency Partnership Intermediary Agreement
- Geospatial Insurance Consortium
- India State Level Property Tax Program
- 3D Elevation Program
- GPS on Bench Marks Partnership
- California Public Safety Power Shutoff Partnership
- TomTom Data Maintenance Pilots with U.S. States

From these use cases, a set of common success characteristics and cautionary lessons learned were documented to inform government decision makers of detailed considerations that need examination in advance of entering into a partnership arrangement. The subcommittee also developed a conceptual governance model with a goal to facilitate more efficient consideration and formation of P3s through convening representatives from all levels of government and other organizations across the public and private sectors for the purpose of collaborative decision making.

The subcommittee formulated the following recommendations regarding the application of P3s and other innovative partnerships to advance the NSDI. For each recommendation, the subcommittee included references to corresponding objectives cited in the NSDI Strategic Plan:

Recommendation 1: Encourage public and private sector organizations to leverage the findings, insight on success factors, references and case studies identified in this recommendation paper to establish and advance P3s and other innovative partnerships to address high priority needs of the NSDI. *(NSDI Strategic Plan Objectives 2.4, 3.2 & 4.3)*

Recommendation 2: Request the Federal Geographic Data Committee (FGDC) organize dialog with geospatial associations, including but not limited to member organizations of the Coalition of Geospatial Organizations (COGO) to obtain their input on priority geospatial data needs for present and future uses. Participants should include the NGAC, FGDC stakeholders, and other geospatial organizations and relevant professional and industry associations, to obtain a complete picture of the requirements for the data layers of the NSDI. Engagement of leaders from States, counties and cities through their representative organizations will be critical. *(NSDI Strategic Plan Objective 4.1)*

Recommendation 3: The NGAC should work with the FGDC and stakeholders to design a recommended strategy for the creation of a national collaborative governance process to guide a more efficient investigation, prioritization, and implementation of P3s and other innovative partnerships to advance the NSDI. One of the key priorities of the NSDI is to make available consistent nationwide coverage of key geospatial data themes. A national convening process to join government at all levels in conversation with academic and industry entities is key to uniting the diversity of government authorities and private sector interests to form more cost effective, optimized partnerships. *(NSDI Strategic Plan Objectives 1.4 & 4.1)*

Recommendation 4: The NGAC and FGDC should approach appropriate stakeholder organizations to lead in the design of a strong P3 educational and engagement communications program. Such a program will be essential to ensure that the geospatial community is, and remains, in agreement about the role of P3s and other innovative partnerships as NSDI enabling mechanisms, as well as how these partnerships are best and most effectively used for this purpose. Education and engagement, along with strong national governance, will also help ensure that partnerships are implemented in all areas of the country where they are most needed, consistently building out the NSDI nationwide. *(NSDI Strategic Plan Objective 4.2)*

Recommendation 5: The NGAC and FGDC should continue to periodically monitor existing partnership use cases, examine and document additional P3s and other innovative partnerships involving geospatial data, services and infrastructure, and to communicate the value of additional geospatial P3s and innovative partnerships in the national and international community. The collection of additional documented use cases can help provide greater insight into elements needed for successful partnerships and issues to avoid, while helping to inspire public and private sector organizations to pursue such partnerships in the future. *(NSDI Strategic Plan Objective 4.3)*

2.0 Introduction

Partnerships are the cornerstone of the NSDI. Valuable geospatial information - essential for our improved understanding and decision making regarding social, economic, and environmental topics - is created and managed across all levels of government, as well as within the private sector, academia, and non-governmental organizations. The FGDC's network of partnerships with Federal, State, Tribal and local governments, associations, and academia are a major component of the success to date in establishing and advancing the NSDI to serve the Nation's needs. However, significant challenges remain to coordinate effectively across thousands of government entities at the township, city, State, regional and Tribal levels. The rapidly expanding capabilities of industry and academia illustrate the need for a greater non-government organizational role in advancing the NSDI. These realities suggest that an increased focus on public-private partnerships is warranted to advance the NSDI in a more inclusive and cost effective manner, to make the best use of limited resources, and to further leverage the capabilities and innovation of industry.

The critical value of and need for stronger partnerships in advancing the NSDI is underscored in the newly adopted 2021-2024 NSDI Strategic Plan, as well as in the GDA. The GDA encourages Federal agencies to partner across all levels of government, with academia and the private sector to advance NSDI data themes, and states that agencies "may, to the maximum extent practical, rely upon and use the private sector in the United States for the provision of geospatial data and services".¹ The NSDI Strategic Plan cites the need for partnerships across sectors to "meet national needs, priorities and circumstances"².

The focus of the NGAC on improved partnerships began in 2009, when NGAC members investigated the potential of P3s as an approach for advancing a [National Parcel Database](#). In 2012, the NGAC issued a white paper on [Innovative Strategies for Geospatial Programs and Partnerships](#). The white paper included a recommendation for the FGDC to explore "utilizing public-private partnerships and other innovative solutions to develop geospatial data, fill critical data gaps, and leverage scarce resources." The NGAC has explored the potential role of P3s and other innovative partnerships as part of the 2013 report to the FGDC on the [Strategic vision of the National Spatial Data Infrastructure](#), to underscore the need for a [National Address Database](#) (2014), to build a nationwide [3D Elevation Program](#) (3DEP) (2015), to address the implications of [Emerging Technologies and the Geospatial Landscape](#) (2016), and to address the benefits of [Geospatial Data As A Service](#) (2018).

P3s have demonstrated value in advancing major physical infrastructure programs in the U.S.A. and internationally where broadly shared public and private interests exist. The sharing of mutual objectives, along with the greater sharing of risk and reward by both the public and private sectors, underpins these arrangements. The NSDI is fundamentally a data infrastructure

¹ Extract of "Geospatial Data Act of 2018" (GDA), (P.L. 115-254), H.R. 302, Subtitle F, Sections 751 – 759, <https://www.fgdc.gov/gda/geospatial-data-act-of-2018.pdf>

² 2021-2024 NSDI Strategic Plan, Goal 4, November 2020, <https://www.fgdc.gov/nsdi-plan/nsdi-strategic-plan-2021-2024.pdf>

and integration project akin to physical infrastructure projects, though often more difficult to grasp given its ubiquitous nature. Infrastructure is defined in the Oxford English Dictionary as “the basic physical and organizational structures and facilities needed for the operation of a society or enterprise”. In addition to physical computing resources (networks, servers, etc.), the NSDI includes other important elements (geospatial data, governance structures, people, standards and policies) that are crucial for addressing social, economic and environmental objectives. As such, it is envisioned that some of the same P3 approaches used to enable and advance physical infrastructure projects can be leveraged to enable and advance the NSDI.

A data infrastructure project could be similar to a toll road or a wastewater treatment plant in its potential to serve the public good and to generate revenue over time and to define those revenues in advance. With a physical infrastructure project, competitive tension is built in so that the maximum efficiency can be gained from the project. Public entities typically require upfront financing from private companies or consortia, and the private partner begins to see payback from the public entity that owns the asset upon substantial completion of the project. Therefore, we can apply this approach to development of data infrastructure for public good if there are assurances up front that the demand exists to ensure a revenue stream for industry. Furthermore, as with physical infrastructure, there is potential to apply this approach not only to the construction, but also to the operation and maintenance of data infrastructure.

Given the broad utility of geospatial information and technologies associated with the NSDI, and the emphasis of the GDA and the NSDI Strategic Plan to “work in partnership” across public and private sector organizations, P3s and other innovative partnerships have potential to be a significant and impactful mechanism for advancing the NSDI.

2.1 The Subcommittee Task

In 2019, at the request of the FGDC, the NGAC formed a subcommittee to develop specific recommendations on the potential application of P3s as a mechanism to further advance the capability and resources of the NSDI, and in turn, to enable improved understanding and decision making for public sector policymakers and program managers, as well as for private-sector organizations, academia, and the general public.

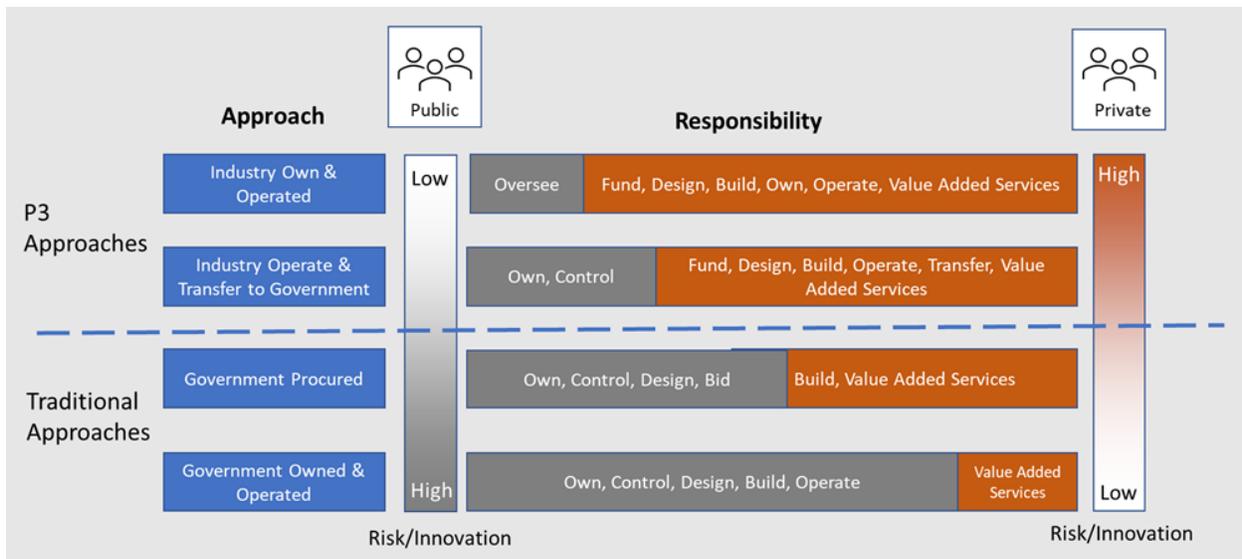
The NGAC subcommittee was tasked to: 1) assess geospatial data availability and trends by government/industry, 2) examine case studies of P3s and other innovative cooperative partnerships to identify goals, benefits, and cautionary lessons that can help inform and shape more productive future partnerships, and 3) identify potential areas of collaboration for the NSDI.

The work of the subcommittee is intended to contribute to the development and implementation of the NSDI Strategic Plan, and most importantly to the NSDI itself.

2.2 What is a P3?

P3s are agreements between public and private entities that provide mutual, often long-term benefit to public and private sector goals, while leveraging industry innovation through the equitable sharing of risk and responsibility. While P3s are typically associated with physical infrastructure projects such as toll roads, or public utilities such as water and wastewater treatment infrastructure, their application to information technology (IT) infrastructure and geospatial information has also been documented.

P3s are innovative joint venture mechanisms established between the public and private sectors intended to accomplish partner objectives through economies of scale, and produce outcomes that neither partner can achieve as effectively independently. They can occur across all levels of government, and while there may be different levels of maturity for each P3, they generally occur over long (5+yrs.) periods of time. As illustrated in Figure 1, unlike the traditional contracting mechanisms and cooperative agreements typically employed by governments, P3s involve a much greater level of shared risk, responsibility, and hopefully reward. Given the innovative nature of these mechanisms, inclusive governance processes involving all partners are required.



Adapted from "Visualizing Trends in Transportation Infrastructure public-Private Partnerships", <http://individual.utoronto.ca/siemiatycki/PPP%20Introduction.html>

Figure 1: Public-Private Partnerships: Approaches and Levels of Responsibility for Public and Private Sector Partners

P3s can play an important role in building out the NSDI, and if implemented across all levels of government, major advances could be achieved.

In the subcommittee's review of literature and through its studies of, and interviews with, leadership of ongoing projects, it became clear that there is no single definition of a P3, and that there is no "one size fits all" approach for establishing successful P3s. Each P3 is specific to the goals and objectives of the project at hand. For the purposes of this paper, and after review

of many P3 definitions offered by the community, the NGAC P3 subcommittee developed the following definition for P3s that leverages the commonalities observed:

"A long-term agreement between one or more public agencies (Federal, State, and/or local) and private sector entity or entities that includes shared responsibility, risk, and reward among the parties. Through this agreement, the skills and assets of the private sector are employed in delivering a product, service, or infrastructure for use by the public at large."

This type of arrangement is quite different from more traditional methods of product and service provision, such as traditional government procurement contracts for which the goal is the "purchase, lease, or barter of property or services for the direct benefit or use by the Federal Government". P3s are typically defined by a formal agreement such as a Memorandum of Understanding (MOU), are long-term, can involve one or more contracts / funding arrangements from public and private sector entities over the life of the partnership, often involve the formation of a special purpose vehicle³ to provide P3 management and oversight, include cost and revenue sharing, and have one or more operational partners to provide services.

2.3 Why are P3s Important?

As our definition and Figure 1 describes, P3s are by their nature long-term partnerships between one or more public and private entities to deliver public services and goods. There is greater transfer of responsibility and project risk to industry above and beyond traditional contracting, enabling industry to innovate to deliver public goods and services amidst a rapidly changing technological environment. P3s provide for public good while enabling terms that allow industry to benefit from good performance and potential for profit from approaches such as value adding. They offer partners opportunity for reduced lifecycle cost and reduced technology risk often associated with government designed, acquired and operated solutions.

...successful P3s have several common elements, including leveraging the strengths of the public and private sectors, appropriate risk transfer, transparent and flexibly contracts, and alignment of policy goals...

Committee on Transportation & Infrastructure, U.S. House of Representatives, January 2014, Special Committee on Public Partnerships.

A near-term challenge for the NSDI is to create and maintain a nationwide, consistent coverage of geospatial data layers of value to multiple levels of government, the public, and commercial entities. The sheer complexity of partnerships across Federal, State, Tribal and local government and industry organizations required to achieve such a goal merits deeper consideration of P3s as a goal to advance the NSDI. While still a nascent reality for soft infrastructure like the NSDI, P3s are increasingly maturing in the community as our findings below have identified.

³ APMG International, <http://ppp-certification.com/ppp-certification-guide/61-introduction-basic-ppp-project-structure>

2.4 So then, what are Other Innovative Partnerships?

The subcommittee identified a number of cooperative partnership arrangements in the geospatial community that were providing substantial public good. These innovative partnerships extended beyond the traditional contracting mechanisms between government and the private sector, but for a variety of reasons (short-term duration, informality of agreements, solely based on in-kind resources, etc.), did not fully meet the definition of a P3. Yet these cooperative partnerships bring together the public and private sectors in relationships that produce results worthy of consideration in advancing the NSDI. Further, in several of the use cases reviewed, the subcommittee identified potential for such partnerships to evolve over time into P3s.

3.0 Approach

The subcommittee studied a number of U.S. and international projects and interviewed program leadership to better understand the characteristics of P3s and other similar innovative partnerships that make them successful, as well as approaches to avoid. The following partnership initiatives, each possessing various levels of maturity with respect to the definition of a P3, were documented as case studies by the subcommittee:

P3s and Innovative Partnerships with P3 Characteristics:

- **Alberta Data Partnerships** (Alberta, Canada): An own-and-operate P3 empowered by the operational capability and innovation of industry partners to support the Province's digital geospatial data management and distribution function on behalf of the provincial government.
- **National Geospatial-Intelligence Agency (NGA) Partnership Intermediary Agreement:** A partnership program that leverages an intermediary authority/organization to facilitate technology transfer between industry, academia and NGA in priority areas of interest. Reciprocal transfer of geospatial technology between government and industry/marketplace has potential to benefit advancement of the NSDI.
- **Geospatial Insurance Consortium:** A key NSDI strategic goal is to make key geospatial data themes available nationwide. The GIC industry consortium provides the insurance community with access to high resolution, consistent, nationwide imagery and geodata, as well as quick response imagery for the insurance industry and first responders during disaster events.
- **India State Level Property Tax Management:** A multi-year P3 initiative to develop, operate and transfer to government a capability that depends on accurate and consistent state-wide geospatial information to support property tax assessment, management and collection.

Other innovative partnerships for improved services and data sharing as underscored in the NSDI Strategic Plan:

- **3D Elevation Program (3DEP):** A USGS managed program on behalf of Federal, State, local and other partners and users to establish a nationwide high resolution elevation model. Elevation data is a critical component of the NSDI to support a range of uses including flood risk management, infrastructure construction, resource management, conservation, energy development, agriculture, and a host of other nationally significant applications.
- **GPS on Bench Marks Partnership:** A public/private sector collaborative partnership to improve the accuracy of the nation's geodetic network - a vital component of the NSDI.
- **California Public Safety Power Shutoff (PSPS) Partnership:** A partnership enabling the sharing, integration and application of geospatial and other related data among electric utilities, government and other community stakeholders to improve preparedness and response to wildfires and other disasters. Consistent with the NSDI Guiding Principles, this partnership includes the sharing of openly available information as well as the safeguarding of proprietary and PII information, with sharing of such data only to authorized officials in support of their work to protect lives and property during disaster events.
- **TomTom Data Maintenance Pilots with U.S. States:** A cooperative partnership between U.S. States and TomTom to identify and pilot potential business models and approaches for collaboration to jointly improve the currency, accuracy, cost effectiveness and maintenance of public and private sector road network data.

From these case studies, it is clear that each one, in its own right, can contribute to the build-out of a national spatial data infrastructure, as they directly or indirectly include location-based data. In the case of the Alberta Data Partnership, GPS on Benchmarks and the States/TomTom partnerships, location-based data is being generated collaboratively. In the other case studies, some derivative product or service is being generated. The subcommittee, therefore, identified key characteristics of success and cautionary lessons applicable to geospatial partnerships and worthy of consideration as government organizations consider entering into such arrangements.

The subcommittee plans to continue identifying, assessing, documenting and making publicly available additional case studies for P3s and innovative partnerships to continuously refine our understanding and recommendations for the use of these partnerships in further advancing the NSDI.

4.0 Findings

4.1 Characteristics of Success

In our review of use cases, we found a number of characteristics associated with successful P3s and other innovative partnerships. The table below illustrates the maturity of each characteristic - High (●), Medium (◐), Low (◑), or N/A (○) - as reported by partnership leads for each of the use cases that we reviewed:

P3 Characteristics		Partnerships							
		Alberta Data Partnership	Geospatial Insurance Consortium	NGA Data Partnership	India Tax Management Partnership	3D Elevation Program	GPS on Benchmarks	California PS Power Shutoff	State TomTom Data Partnerships
Enabling Conditions	Capable industry partner(s)	●	●	●	●	●	○	●	●
	Clearly defined roles and responsibilities for all parties	●	●	●	◐	●	●	◑	◑
	Well identified and aligned goals and expectations of stakeholders	●	◐	●	◐	●	●	●	◐
	Well defined partnership and governance model	●	◐	●	●	●	●	◐	◐
	Shared risk and reward	●	◐	●	●	◑	◐	◐	◐
	Clearly defined ownership, IPR and licensing terms	●	●	◐	●	◐	●	○	◐
Operational Components	Joint Venture / Special Purpose Vehicle	●	●	●	○	○	○	○	○
	Long term agreements to encourage stability and time to succeed	●	●	◐	●	◐	◐	◐	○
	Diversified revenue model to minimize financial risks	●	◐	◐	◐	◐	○	○	○
	Incentivize industry capabilities and innovation to address public needs	●	●	●	●	◐	○	●	●
	Regular innovation cycles to increase efficiencies / effectiveness	●	●	◐	◐	◐	●	●	○
	Leverage piloting and experimentation to validate costs, benefits, outcomes	●	●	◐	◐	●	○	◐	●
Communication & Engagement	Strong stakeholder engagement	●	◐	●	◐	●	●	●	◐
	Strong program of communication/outreach of benefits	●	◐	◐	●	●	●	◐	●
	Establish/maintain trust across stakeholders	●	●	◐	◐	●	●	●	●
Average P3 Score		●	◐	◐	◐	◐	◐	◐	◐

Figure 2: Success Characteristics Associated with P3s and Other Innovative Geospatial Partnerships

4.2 Cautionary Lessons

As part of its examination of use cases, the subcommittee identified a series of cautionary lessons that should be considered when exploring P3 arrangements:

Government legal and statutory conditions vary across departments and agencies, and may impede establishment of P3s. Public sector agencies are bound by a range of laws, policies or statutes that may encourage, limit or prohibit certain relationships and transactions with the private sector necessary to establish P3s. Counsel should be consulted prior to entering into partnerships (see the following section on Statutory and Legal Considerations).

Intellectual property rights (IPR) may be challenging; and proper management and ownership of intellectual property rights must be clearly documented. In all but one of the use cases examined, explicit detailing and agreement on terms regarding the ownership, assignment and transfer of IPR was crucial to success. In the case of the Alberta Data Partnership (ADP),

geospatial data is owned by the provincial government, but exclusive licensing arrangements are granted to the ADP managing partner to allow for sales and profit sharing. For the NGA Partnership Intermediary Agreement, IPR transfer is a major objective of the partnership.

In addition to a strong governance process and long-term commitment as noted in the success factors above, the **continuous monitoring of progress through metrics** is a must to assure accountability of all parties and progress toward meeting objectives of the project.

Communications with stakeholders and timing is critical. The ADP Executive noted that communication with both senior political leadership and program leadership has been important to sustain P3 support over the long term. Further, arranging renewal of formal agreements and contracts to avoid election cycles was found to be of benefit in preserving project stability.

4.3 Statutory and Legal Considerations

Those entering into P3 arrangements must respect and adhere to applicable statutory and legal requirements associated with participating government organizations. As with many government activities, there are statutory and legal requirements that apply to Federal agencies, and State statutory and legal requirements that apply to each State and their subordinate jurisdictions. A December 2018 [“Guide to Legal Issues Involved in Public-Private Partnerships at the Federal Level”](#) is the result of a Federal government interagency working group involving representatives from 19 agencies with experience with P3 activities. The Guide provides insights and recommendations regarding the range of statutory and legal requirements that should be considered before entering into a P3. It focuses on three core activities:

- **Drafting Memoranda of Understanding (MOU).** A typical mechanism for defining the purpose, scope, expected outcomes/effectiveness and performance metrics of a P3 arrangement, and to help P3 activities stay “within the bounds of ethical and legal requirements”.
- **Financial Transactions.** A P3 may include a mix of financial instruments including contracts, grants, gifts, etc., which must be examined in the unique context of a P3.
- **Evaluating Outcomes.** Determine the performance/success of P3 activities through the application of specific metrics. These may be tied to conditions necessary to receive government payment and/or in-kind resources, or to continue or curtail a P3.

The Guide provides a detailed discussion on topics that agencies should address with appropriate agency officials, including legal counsel and ethics officers as part of their due diligence review before entering into a P3, with focus on:

- **Authorization and Appropriations.** Planned obligations / funding must be aligned with the statute appropriating the funds.

- **Legal Requirements.** Adherence to legal requirements of contracts, grants and other financial transactions. As part of a P3, legal responsibilities of all partners must be adhered to.
- **Endorsement.** Avoid violations of the Code of Federal Regulations (C.F.R.) regarding Standards of Ethical Conduct related to endorsing a “product, service or enterprise”.
- **Personally Identifiable Information (PII).** Assure PII safeguarding and authorized data sharing.
- **Intellectual Property Rights.** Ownership of information created as part of the P3 should be clearly defined and documented.



Figure 3: Case Study Maturity Assessment

- **Paperwork Reduction Act (PRA).** PRA requirements must be adhered to.
- **Gift Acceptance.** P3s may involve the potential for a government agency to be in receipt of resources from partners (funding, in-kind contributions, etc.) outside of appropriations, which may not be allowed by statute unless an agency has appropriate gift acceptance authority.
- **Permissible Categories of Partners.** While there are generally no statutes barring agencies from working with different private and public sector entities in a P3, attention must be paid to specific instances in which an agency should refrain from engagement with certain organizations.
- **Conflicts of interest.** Relationships between government and private company employees must be examined to avoid potential harm to the partnership.

Finally, unlike grants and traditional contracts which require a relatively modest level of government oversight, for P3s to be successful government agency stakeholders must plan for and commit to significant multi-year engagement and oversight throughout the intended lifecycle of the initiative.

4.4 From Innovative Partnerships to P3s

The subcommittee recognizes that a range of innovative partnerships exist with varying levels of persistence and maturity with respect to the definition of a P3 provided above. As agencies consider the potential benefit of pursuing P3 arrangements, existing community projects and programs should be examined to determine if there is potential for the experiences and outcomes of these projects to inspire establishment of P3s to address public sector needs. For example, the Geospatial Insurance Consortium (GIC) of the National Insurance Crime Bureau is cooperatively financed by the insurance industry to minimize costs for members. This program provides foundational and rapid response nationwide coverage of high-resolution imagery and related geospatial information for use by the insurance industry under normal and disaster situations and extends free access to first responders for use during disasters.

- What if a program like the GIC was funded by both the public and private sectors to create and maintain such nationwide coverage?
 - Under this scenario the government, which currently commits extensive funding annually to contract, collect, manage and provide access to geospatial resources, would have access to imagery and geospatial information and services hosted operationally by the private sector. Such an approach has potential to significantly reduce government costs, duplication of effort, and risks associated with the collection, maintenance, integration and access to current, high-resolution imagery and geospatial assets. Such an approach would allow for the private sector to leverage these assets to offer value-added services to the marketplace and would open the door to rethinking current business models.
- What if such an approach could meet the needs of multiple US Federal agencies, how might workflows be streamlined, efficiencies be realized, and better outcomes be achieved?
 - FEMA may be more prepared in advance of disaster events, so that immediately after a hurricane, tornado or other event, the high-resolution imagery of the damage area flowed into the official FEMA disaster resources available to all partners.
 - USDA may be able to utilize such imagery for the National Agriculture Imagery Program if requirements were aligned, with freed-up resources invested in creating targeted information products and associated data analytics.
 - USGS could tap annual high-resolution imagery to enhance the quality of National Map and apply cost savings to other priority tasks, while the post-disaster imagery may support other programs such as disaster response.
- What if such a P3 arrangement included agreements with State, Tribal, regional, and local partners for acquisition of annual high-resolution imagery?
 - This approach has the potential to significantly relieve the government of the burden of contracting, oversight, and delivery of the imagery, while securing full access to imagery products and digital services.

- Potential cost savings could be achieved through planned, coordinated annual capture.
- What if a common standard / specification agreed upon by all public sector interests could be included in such an arrangement to assure consistency of nationwide coverage and applicability for all users?
 - A reliable, consistent data source, available government-wide, could influence workflows, standardize processes, and spur innovative thinking related to new uses.
- What if data produced to meet government needs could be made available for broad public use, perhaps at a lesser resolution or longer refresh rate (less current) to assure private sector value-added opportunities?
 - A win-win situation could result, allowing for innovation and commercially successful value-added products, while simultaneously and cost effectively supporting public good.
- What if through this kind of partnership agreement, advanced AI and Machine Learning techniques could be deployed, driven by collective needs and tested across multiple sectors?
 - More flexibility could be achieved for innovation in application development, imagery acquisition, service delivery.
- What if NGOs involved in emergency / disaster response could also be invited into the partnership (e.g., Red Cross, environmental groups, etc.)?
- NGOs would be able to focus on their most important tasks, spending less time on preparation of foundational data and more time applying data to improve delivery of critical services. Insights from such existing partnerships would be invaluable in conceiving and implementing future P3 arrangements that more fully support and enable NSDI development and maintenance.

“By establishing licensing agreements based on currency and resolution of the data, we can support the public good while providing value to the company.”

**Rachel Tidmarsh, Managing Director,
BlueSky World, United Kingdom
Nationwide Imagery Program**

4.5 Governance

For P3s and other innovative partnerships to be successful as enabling mechanisms for the NSDI, collaborative governance of partnerships is essential. Collaborative governance is an organizational structure within which partners make decisions together, deciding on and adjudicating trade-offs, then building and shaping a result in the common and individual interest of all. These are generally partners that have no authority over one another and do not fall under the purview of the same governing body yet have shared objectives or needs. In other words, no single entity is in charge of the activities of all partners, and yet they need to

work together to solve a problem or improve a process because it is in their shared interest to do so.

There are many examples where organizations from multiple levels of government, and sometimes non-governmental organizations, work together to develop, manage, and use geospatial data for issues like childhood trauma, workforce development, emergency response, public health, stream restoration, and much more. But lacking a collaborative governance structure to enable decisions to be made consistently and repeatedly, these efforts are usually subject to significant waste and loss of efficiency and effectiveness.

Governance is the exercise of authority, control, and shared decision-making over a defined topic. A governance structure embodies a formal recognition of decision rights – who makes which decisions, how those decisions are made, what triggers the necessity for a decision, who sits at the table, who has a say, etc. Governments (at all levels) are traditionally set up in silos, with funds allocated to those silos by a governing body, like a legislature, commission, or council, to perform discrete functions. Collaborative governance to develop, manage, and use geospatial data among private and public sector organizations is an essential mechanism to join silos with shared interests in a relationship of collaboration that produces results that could not be achieved by working in isolation.

There are a variety of governance models for public-private partnerships, but in looking at the use cases for this report such as the Alberta Data Partnership and the Geospatial Insurance Consortium, successful models related to geospatial data partnerships generally have certain characteristics in common. Such models include:

- A board composed of representatives of all stakeholders in the public and private sectors.
- Separate advisory bodies, including one that brings together all stakeholders from the public sector and another that brings together all stakeholders from the private sector.
- An administrator organization (e.g., special purpose vehicle) that plays an implementation role for decisions made by the board, and generally manages the partnership.
- Joint venture agreements can set the terms and conditions for the partnership between the public and private partners.

This subcommittee believes that without a national collaborative governance strategy and function, the U.S.A. would be unable to efficiently stimulate the conditions necessary for effective creation and coordination of public-private partnerships in States and regions across the country. To address these challenges, a national NSDI governance function will serve to:

- Encourage nationally consistent geospatial data themes through the coordination of Federal and national requirements with State and regional P3 implementations;
- Incentivize creation of P3s around the country where needed to advance priority areas of the NSDI – to fill gaps in coverage where needed, and to improve accuracy, currency and utility of information to meet national to local needs;

- Work closely with Congress and the executive branch to ensure resources are in place for the state and regional P3s to be successful, as well as to clear policy, legislative, and regulatory hurdles that might prevent P3s from operating as needed; and
- Encourage dialog across organizations from the public and private sectors.

4.6 Where are P3s most needed?

A major goal of the NSDI is to assure the consistent nationwide coverage of foundational geospatial data, such as high resolution imagery, parcels, addresses, administrative boundaries (e.g., special, water, State, municipal, election districts for election purposes), and underground and above ground utility infrastructure to meet critical public needs. To achieve this goal of nationwide coverage, it is important to acknowledge that State and local governments, as well as private sector entities, are often the most authoritative sources, and therefore must be considered key partners in any collaborative effort. Establishment of new innovative partnerships and P3s should be focused on these high priority areas if coverage gaps exist or processes can be improved such that geospatial coverage is:

- Accessible to all levels of government (Federal, State, Tribal and local) under F.A.I.R. (Findable, Accessible, Interoperable and Reusable) principles;
- Established and collected via agreed upon standards that meet the needs of all partners and users of the geospatial data;
- Available for the private sector to benefit from added value; and
- Orchestrated for single collection yet served for multiple uses and continually maintained for ongoing use.

Other areas of importance include access to less traditional geospatial data and services typically generated by the commercial sector, but critical for public sector needs such as:

- Mobility data (e.g., anonymized cell phone data) and social media feeds (to address emergencies, pandemic responses); and
- Urban precise positioning (indoor, outdoor), geospatial analytic tools that leverage AI/ML, and other emerging technologies.

This subcommittee notes that the recent NSGIC, COGO, and FGDC geospatial assessments below will serve as useful resources for use by Federal, State, Tribal and local authorities to determine priority areas for P3s and other innovative partnerships to fill gaps in national geospatial data layers.

- <http://www.nsgic.org/geospatial-maturity-assessment>
- <http://cogo.pro/report-card>
- <http://communities.geoplatform.gov/ngda-portfolio/ngda-lifecycle-maturity-assessment/>

5.0 Recommendations

This subcommittee, through its review of literature and examination of a range of use cases, recommends a series of actions to better position the Nation to advance the NSDI in closer partnership between public and private interests. These recommendations also consider the intent of the GDA in encouraging partnerships to advance the NSDI, and align with the goals and objectives set forth in the [2021 - 2024 NSDI Strategic Plan](#).

Recommendation 1: Encourage public and private sector organizations to leverage the findings, insight on success factors, references and case studies identified in this recommendation paper to establish and advance P3s and other innovative partnerships to address high priority needs of the NSDI. *(NSDI Strategic Plan Objectives 2.4, 3.2, 4.3)*

Recommendation 2: Request the Federal Geographic Data Committee (FGDC) organize dialog with geospatial associations, including but not limited to member organizations of the Coalition of Geospatial Organizations (COGO) to obtain their input on priority geospatial data needs for present and future uses. Participants should include the NGAC, FGDC stakeholders, and other geospatial organizations and relevant professional and industry associations, to obtain a complete picture of the requirements for the data layers of the NSDI. Engagement of leaders from states, counties and cities through their representative organizations will be critical. *(NSDI Strategic Plan Objective 4.1)*

Recommendation 3: The NGAC should work with the FGDC and stakeholders to design a recommended strategy for the creation of a national collaborative governance process to guide a more efficient investigation, prioritization and implementation of P3s and other innovative partnerships to advance the NSDI. One of the key priorities of the NSDI is to make available consistent nationwide coverage of key geospatial data themes. A national convening process to join government at all levels in conversation with academic and industry entities is key to uniting the diversity of government authorities and private sector interests to form more cost effective, optimized partnerships. *(NSDI Strategic Plan Objectives 1.4, 4.1)*

Recommendation 4: the NGAC and FGDC should approach appropriate stakeholder organizations to lead in the design of a strong P3 educational and engagement communications program. Such a program will be essential to ensure that the geospatial community is, and remains, in agreement about the role of P3s and other innovative partnerships as NSDI enabling mechanisms, as well as how these partnerships are best and most effectively used for this purpose. Education and engagement, along with strong national governance, will also help to ensure that partnerships are implemented in all areas of the country where they are most needed, consistently building out the NSDI nationwide. *(NSDI Strategic Plan Objective 4.2)*

Recommendation 5: The NGAC and FGDC should continue to periodically monitor existing partnership use cases, examine and document additional P3s and other innovative partnerships involving geospatial data, services and infrastructure, and to communicate the value of additional geospatial P3s and innovative partnerships in the national and international community. The collection of additional documented use cases can help provide greater insight

into elements needed for successful partnerships and issues to avoid, while helping to inspire public and private sector organizations to pursue such partnerships in the future. (*NSDI Strategic Plan Objective 4.3*)

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