

Communities Utilizing Remote Virtual Inspection (RVI)

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Key Takeaways

- Remote Virtual Inspection (RVI) is a technology-driven method for assessing the design, operation, and performance of buildings.
- Various communities showcase the versatility of RVIs. Examples include Pima County and Phoenix, Arizona, offering RVIs for diverse solar installation inspections and for issuing residential permit types and Sacramento, California, utilizing drones for elevated solar panel inspections.
- RVIs employ a range of technologies, such as FaceTime, Google Duo, Microsoft Teams, and specialized applications like VuSpex and Camino. The flexibility in technology highlights adaptability across different inspection contexts.
- RVI programs have demonstrated multiple benefits including efficiency, improved recordkeeping, accessibility, and cost-effectiveness across different inspection types. While these programs generally began during the pandemic, given short-term needs, they have since continued because of these multiple benefits.
- Program administrators can enhance RVI utilization by establishing clear guidelines and encouraging awareness through outreach programs, workshops, and training sessions.

Introduction

Remote Virtual Inspection (RVI) involves the use of remote visualization technologies and methods to inspect, certify, audit, and diagnose the design, operation, or performance of buildings. While RVIs gained popularity during the COVID-19 pandemic, numerous jurisdictions have since expanded and sustained their support for RVI programs. This resource provides current examples of RVI programs to demonstrate various approaches to implementation, and it is intended for communities and jurisdictions seeking to optimize their inspection practices and promote efficiency, accessibility, and inclusivity in inspection services.

1. Arizona

- [Pima County](#) is conducting all residential rooftop-mounted solar inspections remotely by utilizing the VuSpex application.
- [Phoenix](#) offers RVIs for various residential permit types including main breaker “de-rate” for photovoltaic panel installations, electrical service upgrades up to 200 amps, electric meter socket replacement, minor electrical work, water heater replacement, minor plumbing work, bathroom re-piping (1, 2, or 3+ bathrooms), repair or replacement of gas lines, gas clearance inspections, and sewer line inspections.



- [Tucson](#) allows RVIs, using either FaceTime or Google Duo applications, for solar installations and service upgrades.

2. California

- [Placer County](#) has implemented a video inspection program to provide an alternative for eligible inspections, including limited reinspections.
- [Santa Clara](#) can receive requests for RVIs for most types of inspections; however, assigned inspectors will make final determination as to whether virtual inspections may be done. Inspectors may determine that an in-person inspection is required. Inspectors will use their knowledge and the list of approved RVI types published by the county to make their determination.

The installation of solar panels demands a different approach in inspections due to their elevated location. Drones have proven to be useful tools in conducting effective and safe inspections, providing detailed visuals and access to hard-to-reach areas. Sacramento, California, has introduced the [Unmanned Aircraft System](#) (UAS) Inspection Program, which allows inspectors to use drones for completing inspections. Initially, drones will be used exclusively for solar panel inspections.

3. Colorado

- [Centennial](#) allows RVIs for occupied residential spaces where remodeling, alteration, basement finish, and additions are accessible only through occupied spaces and similar construction is taking place. All outside inspections, inspections of new construction including additions accessible from the exterior, and inspections for public safety (assessment of damage from fires and vehicles, restorations of utilities, and critical facilities) will be performed as typical field inspections.
- [San Diego](#) allows for qualified single-family, duplex, and townhouse projects to undergo virtual inspections using the Microsoft Teams conferencing platform, with customers present at the job site while a city inspector remotely reviews various aspects such as HVAC systems, electrical panels, plumbing repairs, heating, and more.
- [Oakland](#) allows for RVIs when the Air Quality Index (AQI) exceeds 201 or upon direction from the Oakland city administrator.
- [Corona](#) allows remote inspections for an extended list of inspection types.
- [San Ramon](#) initially introduced RVIs for water heaters replaced in the same location; however, upon request, RVIs may also be extended to other smaller projects.
- [Anaheim](#) is implementing RVIs to enhance efficiency and reduce environmental impact by minimizing travel time for inspectors, thereby allowing inspections to be conducted remotely.

4. Connecticut

- [West Hartford](#) allows the use of RVI as an alternate inspection method to an in-person on-site inspection. Eligible inspections are determined by the chief building official or their designee based on the type of inspection and outside factors such as the complexity of the project, construction methods, safety, weather, and/or other contributing factors. RVIs are meant to be live via audio and video, conducted at an allotted time with both inspector and permit holder, contractor, or building owner on site.
- [Norwich](#) can receive requests for either on-site or remote inspection; however, the city only uses RVIs for reinspections to show compliance after adjustments or changes were made or for minor projects.
- [Manchester](#) allows for RVIs for some interior inspections. The program has proven effective especially in addressing staffing shortages and in facilitating inspections in challenging weather conditions.

5. Delaware

- [New Castle County](#) allows RVIs for inspections involving slab on grade, minor framing/installations, reinstallations, HVAC and plumbing replacements, and roofing system replacements.

6. Florida

[Florida Building Code](#) allows a state or local enforcement agency to perform virtual inspections at their discretion. Based on this law, many communities have introduced RVIs:

- [Charlotte County](#) has introduced RVIs for mechanical, plumbing, roofing, and water heater work. The remote inspections are done with the VuSpex application.
- [Brevard County](#) allows RVIs for drywall, electrical final, fence, footing, insulation, mechanical final, monolithic slab, and roof dry in, through the VuSpex application.
- [Miami-Dade County](#) allows certain inspections to be conducted remotely.
- [Pinellas County](#) provides the option to complete certain inspections virtually.
- [Manatee County](#) has extended its list of inspection types that can be completed remotely using the VuSpex application. Virtual inspection can be conducted for projects including roofing, siding, flashing, door and window bucks, service changes, mechanical and plumbing finals, water services, and roof finals.
- [Orange County](#) allows for RVIs for projects involving final inspection of windows and doors, residential underground, concrete encased/footer bond, final inspection of air conditioning change-out, irrigation, final inspection of water heater change-out, and re-pipe.
- [Pasco County](#) is allowing RVIs with the use of VuSpex application.
- [Fort Walton Beach](#) allows RVIs for existing sewer replacements, A/C or HVAC unit change-out, duct work replacement, water heater replacement, window/door replacement, interior electrical rewires, and panel change-out.



- [Marco Island](#) allows RVIs for building, plumbing, mechanical, and electrical work.
- [Venice](#) offers VuSpex, an RVI tool that provides inspection services to contractors remotely with the use of any electronic device. All re-roof and window/door buck inspections are conducted remotely.
- [Greenacres](#), [Tampa](#), and Winter Springs had implemented RVI programs; however, all cities confirmed that they have discontinued the use of RVIs and reverted to in-person inspection. The reasons for this decision were not disclosed, but it marks a shift back to traditional inspection methods.

What is a VuSpex?

[VuSpex](#) is an RVI tool that provides inspection services to contractors remotely with the use of any electronic device, even in areas of poor connectivity. Many jurisdictions have adopted VuSpex's RVI services to improve inspection procedures and enhance safety in construction projects.

7. Illinois

- [Illinois](#) mandates that all building-permit-related inspections be requested using online forms available on the city of Chicago's website, exclusively accepting online submissions for inspection requests. Although more information is to be found, this provides evidence that Illinois has the foundation to create an online platform for intake of RVIs.

8. Iowa

- [Iowa](#) has implemented a virtual inspection program as a response to the early stages of the COVID-19 pandemic, with 318 virtual inspections conducted in state fiscal year 2021. This program is integrated into the Department of Inspections and Appeals and is applicable to various inspection types, including routine, follow-up, pre-open, compliant, temporary, and other inspections.
- [Iowa City](#) has integrated Remote Virtual Inspections (RVIs) into its building code compliance procedures, aligning with the broader trend in the state of Iowa. The city has introduced a New Customer Self-Service (CSS) Portal, replacing traditional paper or electronic application forms. This digital platform encompasses various aspects of urban planning, building inspections, rental housing inspections, zoning, site plan review, and public works, emphasizing the transition to online submission processes. Specifically, this system requires online submission for land development applications, historic reviews, and board of adjustment applications, aiming to enhance accessibility and efficiency for both applicants and city authorities. This shift to online submissions reflects the growing importance of RVIs, making it easier for residents and businesses in Iowa City to seek building permits and comply with local building codes while facilitating remote virtual inspections where needed.

9. Maryland

- [Prince George's County](#) allows virtual inspections for limited projects, including residential construction projects involving electrical service upgrades, electrical reconnects, mechanical service upgrades, and follow-up inspections.

10. Kansas

- [Lawrence, Kansas](#), adopts the use of RVIs that can be scheduled 24/7 through the Inspection Hotline or online through the Citizen Access portal. RVIs may be utilized in lieu of jobsite visits for work on existing homes and dwelling units, and for existing businesses for services like installation of new or replacement equipment, repair or upgrade of electrical services, renovation work, or other limited items of construction at the discretion of the inspector. These inspections are encouraged for equipment replacement work and electrical service upgrades, among other scenarios. They are performed using devices capable of video conferencing, such as FaceTime or Google Duo, with the inspector observing the work remotely in real time. RVIs should be scheduled with the inspector and the person requesting the inspection interacting via video feed. Contractors are encouraged to utilize RVI for all equipment replacement work and for electrical service upgrade work.

11. Minnesota

- [Minnesota](#) has introduced virtual electrical inspection for certain areas of the state. The RVI can be conducted for load management controllers, equipment inspections (e.g., air conditioner, furnace), rough-in inspections with a maximum of three circuits, and reinspections. RVIs are offered in Districts 7 and 10 only, with the intention to expand this service to other areas.

12. Nevada

- [Clark County](#) allows RVIs for rooftop solar installations, patio covers, water heater installations, water softener installations, residential plumbing re-pipe, gas line extensions for residential BBQs and fire pits, A/C (mechanical) change-outs, detached storage sheds (up to 600 square feet), signs, residential block wall/fence, and cell site/antenna installations.
- [North Las Vegas](#) introduced RVIs for projects involving rooftop solar installations, aluminum patio covers, water heaters, water softeners, plumbing re-pipe, gas line extensions for BBQ and fire pits, A/C change-outs, attic FAU installations, main line water repairs, electrical service changes, electric car chargers and storage systems, spa circuits, and detached storage sheds not exceeding 600 square feet. The city conducts over 350 RVIs per week.

13. New Hampshire

- [Nashua](#) allows for RVI in [inspections](#) involving replacement of mechanical equipment, gas service reconnection, plumbing repairs, sewer repair/replacement, electrical repairs and service upgrades, non-structural interior alterations/renovations, and rough electrical, plumbing, and mechanical alterations/renovations up to 1,000 square feet. There is also the possibility of considering permits/projects outside of these. Although the city still allows and promotes RVIs, since COVID-related restrictions were lifted, it has noticed less interest in the RVI program.

14. North Carolina

- [North Carolina Building Code Enforcement](#) allows inspection departments to implement remote inspection procedures in accordance with criteria and procedures. [Morrisville](#) is among the communities in North Carolina that are utilizing RVIs. It is conducting RVIs for certain types of inspections using a platform called Camino; however, the town has seen a lower number of requests after COVID-19 restrictions were lifted.

15. Ohio

[Ohio](#) offers the option of virtual or in-person construction inspections, allowing 24/7 inspection requests through the DIC Web Portal. Various inspection types, including structural, mechanical, electrical, plumbing, medical gas, and fire alarm and suppression systems, can be requested. Rural jurisdictions like Miami, Ohio, have embraced RVIs to reduce travel times and expedite the inspection process, using iPads and iPhones for remote inspections.

- [Miami, Ohio](#), exemplifies how Remote Virtual Inspections (RVIs) have been effectively integrated into building code compliance practices. In response to the need for streamlined inspections and reduced travel times, Miami County's Building Department has harnessed the power of technology to embrace RVIs. Leveraging devices like iPads and iPhones, inspectors conduct remote inspections for a range of scenarios, including concrete slabs, light pole bases, foundation walls, insulation, ice guards, reinspections, and more. This digital transformation enables prompt approvals, as the department is equipped to inspect projects digitally. For an RVI to occur, applicants must already hold a permit for the work, and the type of inspection must align with those acceptable for virtual inspection. The process involves scheduling an appointment, and the inspector and contractor connect through live video, ensuring real-time assessments. The outcome of this forward-thinking approach is a more efficient and accessible building inspection process, enhancing convenience for both inspectors and contractors while maintaining compliance with safety and building codes.

16. Oregon

- [Medford](#) has the option to conduct virtual inspections for specific single-family and duplex projects, including re-roofing, door and window replacements, water heater replacements, and HVAC unit replacements. However, the city confirmed that very few contractors use this option since same-day in-person inspections are available. RVIs are mostly used for minor mechanical and for reinspections.

17. Texas

- [Austin](#) implemented an RVI program for certain residential construction projects. Inspectors utilize video conferencing and other digital tools to remotely assess compliance with building codes, ensuring construction projects meet safety standards without the need for in-person inspections.

18. Virginia

- [Fairfax County](#) will consider approving RVIs for all mechanical, electrical, and plumbing inspections.

19. Washington

- [Seattle](#) allows video inspections using smartphone apps like FaceTime, Microsoft Teams, or WebEx, while Zoom is excluded due to not meeting the city's security standards. The city provides a list of allowed video inspections while acknowledging that certain inspection types may not be suitable for video inspections.

20. Wisconsin

- [Wisconsin's](#) Department of Safety and Professional Services has introduced virtual options, such as virtual tours, virtual open houses, and virtual showings, which are primarily related to real estate. These options allow for remote property viewing and interactions with potential clients and customers. Although this resource is mainly used by realtors, it showcases the foundation for building inspections to utilize the same technology.

**Note: The list above is not exhaustive of all communities nationwide that utilize RVIs. The utilization of RVIs varies among different communities and is subject to ongoing changes. While certain communities may discontinue this approach following the conclusion of COVID-19 restrictions, others are acknowledging the ongoing advantages of RVIs and are implementing new remote inspection programs or policies.*



Key Observations:

The widespread implementation of RVI programs in various communities across the United States has demonstrated the effectiveness and practicality of utilizing available technology for remote inspection purposes. Although RVIs gained popularity during the COVID-19 pandemic as a response to social distancing measures, many jurisdictions have recognized the long-term benefits of this approach and have sustained and expanded their support for RVI programs.

RVIs are being used for a range of inspection types, such as the replacement of mechanical equipment, plumbing repairs, electrical repair and service upgrades, non-structural alterations/renovations, rooftop solar installations, water heater replacement, and HVAC unit replacement. The common technologies used for RVIs include preferred video conferencing platforms such as FaceTime, Microsoft Teams, and Google Duo, as well as specialized applications such as [VuSpex](#), [Clearly Energy](#), and [Camino](#). These tools facilitate real-time communication between inspectors and property owners or builders, enabling virtual inspections to be conducted seamlessly and effectively.

Sustained support for RVI programs beyond the pandemic showcases the long-term benefits and potential of regularly leveraging remote virtual technology in inspection practices. Beyond its initial purpose, RVIs have demonstrated their value in terms of efficiency, accessibility, and cost-effectiveness, and they are in continued use. Communities that embrace RVIs can reduce travel time and expenses associated with inspections, overcome geographical barriers, quickly respond when demand for inspection is high (such as after weather events and disasters), and strengthen code enforcement in remote areas.

Although RVIs have proven effective and efficient in various communities, there remain opportunities to increase their utilization in jurisdictions where they are allowed but underutilized. To maximize utilization, these jurisdictions can conduct outreach programs, workshops, and training sessions to raise awareness among construction firms, third-party inspectors, and other stakeholders about the benefits and practicality of RVIs. In addition, establishing clear and consistent guidelines, and providing technical assistance and support when needed, can further help in the uptake of RVI practices.

RVIs have the potential to bridge the gap and ensure that all communities, regardless of their location and socio-economic status, can access essential inspection services. By leveraging RVI technology, third-party inspectors and code officials can remotely access sites in underserved or remote areas, and eliminate barriers posed by physical distance, travel restrictions, weather conditions, and limited resources, thus democratizing inspection services and promoting equal opportunities for construction and development across diverse communities. As communities continue to embrace RVI programs, they pave the way for a more efficient, sustainable, and inclusive approach to inspections.