

Indiana Risk-Limiting Audit Program

A Proposal by VSTOP to the Indiana Secretary of State

April 6, 2020

Introduction

Much has been reported in the news media in the last few years about the integrity of American elections and the security of voting equipment. This national discussion has centered on two key areas. First, the physical security and cybersecurity of election equipment, and, second, the public's confidence in election equipment, the process of elections and election outcomes. It is noteworthy that the Indiana Secretary of State Connie Lawson has been at the forefront of this discussion, both at the national and state levels, and has been proactive in addressing real and perceived threats to elections. There are several recent key events and items which are relevant to the present report. These include Indiana Governor's Executive Council on Cybersecurity, the Hoosier Survey, a recent report by the Center for American Progress, and the new Indiana election laws addressing election security.

In January 2017, U.S. Elections Systems were designated as part of the nation's critical infrastructure by the United States Department of Homeland Security. Also, in January 2017, Indiana Governor Holcomb signed an Executive Order to continue the Indiana Executive Council on Cybersecurity (IECC) (<https://www.in.gov/cybersecurity/2570.htm>). The Executive Council comprises ten committees and several working groups. The Elections Committee of the Council is chaired by the Indiana Secretary of State Hon. Connie Lawson. Dr. Jay Bagga, co-Director of the Voting System Technical Oversight Program (VSTOP) serves as an Advisory Member to this Council and is a member of the Indiana Executive Council on Cybersecurity Elections Committee.

Risk-Limiting Audits

Risk-limiting audits (RLAs) provide statistical assurance that election outcomes are correct by manually examining paper ballots or voter-verifiable paper audit trails (VVPATs). RLAs do not guarantee that the electoral outcome is correct, but they have a large chance of correcting an outcome if it is wrong. If an original election outcome is incorrect, there is a chance the audit will not correct it. Thus, the "risk limit" is the largest chance that an incorrect outcome escapes correction. For instance, if the risk limit is 10% and the outcome is incorrect, there is at most a 10% chance (and typically much less) that the audit will not correct the outcome.

Correspondingly, there would be at least a 90% chance (and typically much more) that the audit will correct the outcome. Thus, if the risk limit is 1%, then, in the long run at least 99 out of 100 incorrect outcomes would be corrected by the audit.

The number of ballots required to conduct an RLA will vary based on the smallest margin of the contest selected and the risk limit. The smaller the margin, the more ballots one must audit based on the "diluted margin" principle. The smaller the diluted margin and the risk limit, the more ballots one must audit.

While there is a large set of references on RLAs, the following two provide comprehensive introductions and details.

- A Gentle Introduction to Risk-limiting Audits, by Mark Lindeman and Philip B. Stark, IEEE SECURITY AND PRIVACY, SPECIAL ISSUE ON ELECTRONIC VOTING, 2012. <https://www.stat.berkeley.edu/~stark/Preprints/gentle12.pdf>
- A Bayesian Method for Auditing Elections
https://www.usenix.org/system/files/conference/evtvote12/rivest_bayes_rev_073112.pdf

Computer software cannot be guaranteed to be perfect or secure, so voting systems should be software-independent. This means that an undetected change or error in voting system software should be incapable of causing an undetectable change or error in an election outcome. An RLA leverages software independence by checking the audit trail strategically and statistically. Efficient RLAs do not require complicated calculations or in-house statistical expertise.

An RLA software program is used to calculate the number of ballots to audit, randomly select the ballots, provide a ballot lookup table, and notify the user when the audit can cease. Risk-limiting audits depend on sampling methodology as well as statistical methodology. There are four types of sampling methodologies: ballot polling, ballot comparison, batch polling and batch comparison.

Risk-Limiting Audits in the States

Several states are involved in active RLA programs. In 2009, Colorado's HB 09-1335 introduced RLAs to commence with the 2014 General Election. In 2013, Colorado conducted the first pilot RLA at Arapahoe County. More counties were added in 2015-16. Colorado developed rules, procedures and software to conduct an RLA for the 2017 Coordinated Election. The November odd-year election is generally referred to as the coordinated election. Coordinated elections are conducted by mail ballot.

In 2014, Cuyahoga County, Ohio, conducted an RLA for its gubernatorial race. Incumbent John Kasich received 51 percent of the votes cast in the county, and challenger Edward FitzGerald received 45 percent. The county Board of Elections needed to recount slightly more than 8,000 ballots before it could confidently determine that Governor Kasich had correctly been declared the Cuyahoga County winner. The board also audited the race for state treasurer, in which incumbent Joshua Mandel received 39 percent of the vote versus 61 percent for challenger Connie Pillich. In this less competitive contest, fewer than 2,500 ballots were needed to verify Pillich's victory among county voters. In Ohio, the Secretary of State Directive 2017-14 recommended risk-limiting audits.

In September 2017, Rhode Island became the second state to require risk-limiting audits, for implementation by 2020. An article in the Time magazine (<https://time.com/5510100/risk-limiting-audit-election-security/>) highlighted Rhode Island's pilot risk-limiting audit in Providence on January 16, 2019.

Virginia Code § 24.2-671.1 required Post-election risk-limiting audit of ballot scanner machines: "The Department of Elections shall coordinate a post-election risk-limiting audit annually of ballot scanner machines in use in the Commonwealth. The localities selected for the audit shall

be chosen at random with every locality participating in the Department's annual audit at least once during a five-year period. The purpose of the audits shall be to study the accuracy of ballot scanner machines”

In June 2018, Orange County (California) conducted a pilot RLA of several countywide contests. Beginning in 2020 California counties may conduct a risk-limiting audit in lieu of a traditional post-election audit.

In 2019 Indiana passed a law authorizing the Secretary of State to adopt rules and procedures to conduct RLAs in the state. More details are given below.

VSTOP's RLA Activities

Since early 2018, VSTOP has engaged in several activities related to RLAs. This section provides a brief summary of these activities. More details can be found in the references listed below.

One of the deliverables for the Indiana Executive Council on Cybersecurity (IECC) Elections Committee was to create a post-election risk-limiting audit (RLA) protocol proposal. As a component of this activity, VSTOP proposed conducting a pilot RLA in some Indiana counties. VSTOP began discussing the RLA process with Jerome Lovato with the U.S. Election Assistance Commission. Subsequently, VSTOP conducted a pilot RLA in Marion County, Indiana on May 29-30, 2018. In addition to VSTOP personnel, the RLA Team included Jerome Lovato, Professor Ronald Rivest of MIT, Mayuri Sridhar, an associate of Professor Rivest, and Marion County Election Administration personnel. A full report of this pilot can be found in Appendix A.

In June 2018, VSTOP co-Directors Jay Bagga and Bryan Byers delivered a presentation at the State Certification Testing of Voting Systems in Raleigh, NC on *Post-Election Audit Pilots, and New Physical and Cyber Security Requirements in Indiana Election Code*. A copy of this presentation can be found in Appendix B.

In August of 2018, the Michigan Bureau of Elections and the City Clerks of Kalamazoo, Lansing, and Rochester Hills partnered with the Brennan Center for Justice, Professor Ron Rivest and Mayuri Sridhar of MIT, Dr. Phillip Stark and Kellie Ottoboni from the University of California, Berkeley, Jerome Lovato of the U.S. Election Assistance Commission, Verified Voting, and VSTOP to conduct the first multi-municipal jurisdiction RLA pilot in the country. A full report of this pilot can be found in Appendix C.

The Indiana Secretary of State authorized VSTOP to conduct an RLA for Porter County, Indiana after the 2018 general election. That RLA was completed in late January of 2019. Working with the VSTOP personnel were Jerome Lovato, the Porter County Clerk and her staff. A full report of this pilot can be found in Appendix D.

In December 2018, Jay Bagga and Bryan Byers were invited to deliver a presentation at the Multidisciplinary Conference on Election Auditing, or the “Election Audit Summit,” at the Massachusetts Institute of Technology (MIT) in Cambridge, Massachusetts. This conference was

hosted by the Caltech/MIT Voting Technology Project (VTP). A copy of the Report of the Summit (including the VSTOP presentation) can be found in Appendix E.

In order to expose county election officials to the RLA process, an RLA demonstration was conducted for participants in the Certificate in Election Administration, Technology and Security (CEATS) program on June 10, 2019. This demonstration was held in Indianapolis at the Marion County Election Service Center and it used data from the 2018 November Election.

Indiana's New RLA Law

In the 2019 legislative session, Senate Bill 405 was passed and signed into law by Governor Holcomb. Part of this legislation pertains to RLAs. The relevant text from the Bill, now Senate Enrolled Act 405, is as follows:

SECTION 1. IC 3-12-13 IS ADDED TO THE INDIANA CODE AS A NEW CHAPTER TO READ AS FOLLOWS [EFFECTIVE JANUARY 1, 2020]:

Chapter 13. Risk-Limiting Audits

Sec. 1. For purposes of this chapter, a reference to a "county election board" includes the following:

- (1) A county election board established by IC 3-6-5.**
- (2) A board of elections and registration established under IC 3-6-5.2 or IC 3-6-5.4.**

Sec. 2. As used in this chapter, "incorrect outcome" means an outcome that is inconsistent with an election outcome that would be obtained by conducting a full recount.

Sec. 3. As used in this chapter, "risk-limiting audit" means an audit protocol that makes use of statistical methods and is designed to limit to acceptable levels the risk of certifying a preliminary election outcome that constitutes an incorrect outcome.

Sec. 4. (a) The secretary of state may designate counties as risk-limiting audit pilot counties.

(b) For a county to be designated as a risk-limiting audit pilot county, the county election board must adopt a resolution requesting the secretary of state to designate the county as a risk-limiting audit pilot county.

(c) In designating a county as a risk-limiting audit pilot county, the secretary of state shall seek to designate a variety of counties as pilot counties based on the number of active voters within the county.

(d) A county designated as a risk-limiting audit pilot county shall conduct risk-limiting audits as provided in this chapter.

Sec. 5. (a) The secretary of state shall determine, under rules adopted by the secretary of state under IC 4-22-2, the elections that are subject to a risk-limiting audit.

(b) All contested elections for an elected office and all public questions are eligible for designation by the rules for a risk-limiting audit.

Sec. 6. (a) The secretary of state may waive the requirement of section 5 of this chapter, after a written request by a county election board.

(b) The secretary of state may waive the requirement of section 5 of this chapter only if the county election board shows that the technology in use by the county will not enable the county election board to satisfy the requirements for a risk-limiting audit for an election held after December 31, 2020.

Sec. 7. (a) The secretary of state shall adopt rules under IC 4-22-2 necessary to implement and administer the requirements of this chapter.

(b) In developing rules to be adopted under subsection (a), the secretary of state shall:

- (1) consult with recognized statistical experts, equipment vendors, the election division, and county election officials; and**
- (2) consider best practices for conducting risk-limiting audits.**

SEA 405 introduces RLAs to the State of Indiana. As noted in the above statute, a county may request, with County Election Board approval, that the Secretary designate it as RLA pilot county.

Conducting RLAs in Pilot Counties

Conducting RLAs, regardless of the location or jurisdiction, can present challenges. These challenges, however, are not insurmountable with the right amount of planning and organization. One must also be cognizant of the type of voting system or systems in use within a jurisdiction in order to successfully carry out RLAs. Below, we address some potential but surmountable challenges which might be encountered in Indiana.

In order to carry out an RLA, a county must employ a ballot card voting system (IC 3-5-2-4.5) or an electronic voting system (IC 3-5-2-21) which includes a voter-verifiable paper audit trail (VVPAT). We call such a county an *RLA-eligible* county. Thus, counties employing certified ballot card voting systems, commonly referred to as OpScan Systems, are RLA-eligible. However, there are fifty-two counties which use MicroVote DREs. It is anticipated that these DREs will be fitted with a VVPAT device over time given this modification was approved by the Indiana Election Commission (IEC) on July 26, 2019. Current Indiana legislation provides funding to initially equip 10% of the state's DREs with VVPATs.

The MicroVote VVPAT does not convert their DRE to a paper ballot system. Rather, it provides a VVPAT which a voter can review and verify before a ballot is cast. The official ballot will still be the electronic record within the DRE cast by a voter. While paper ballots are ideal for risk-limiting audits, the MicroVote DRE presents a challenge when implementing the audit methodology. One cannot conduct the traditional RLA sampling with the MicroVote VVPAT since the paper record is on a roll of paper and not ballot cards. Rather, a creative alternative will need to be employed such as a systematic sampling approach for the random selection of paper records to audit. VSTOP anticipates conducting a comparative study of paper ballot systems to the MicroVote VVPAT to determine if the different sampling methods matter in the final outcomes of RLAs as well as resource allocation and efficiency. It is our understanding that MicroVote is working on a high-speed scanning mechanism to randomly select paper records from the roll for purposes of an RLA. However, MicroVote needs to provide more details regarding this tool.

A key to a successful RLA is ballot organization. In order to carry out an RLA, the current practice is that all of the ballots in a county be organized by precinct. This includes remade ballots, absentee ballots and regular ballots. Given the variety one might see among vote center counties regarding ballot organization, VSTOP recommends performing RLAs only on County, State and Federal contests unless vote center counties organize the ballots by precinct. To perform an RLA on other local races, the ballots should be organized by that locality. These factors could impact the budget for the pre-RLA preparation process. Concerning Batch Polling/Batch Comparison RLAs, VSTOP believes that performing RLAs for local races in DRE vote center counties with VVPATs would present additional challenges. However, these challenges are surmountable.

Goals of the Indiana Risk-Limiting Audit Program

We believe that RLAs can help in meeting the overall goal of enhancing the integrity of elections and increasing public confidence in election outcomes. In order to be in line with the national, and fast moving, trend toward the use of RLAs in states, Indiana is well poised to be at the forefront and a goal would be to maintain this position. Therefore, Indiana's new RLA law has come at an opportune time.

One goal should be to evolve the RLA program to train counties so they could eventually, and independently, conduct such post-election audits. VSTOP, in collaboration with its established RLA expert partners, can conduct RLAs once the Secretary makes these pilot county designations based on county election board requests. County personnel would have to be present and be active participants in order to (a) handle the ballots and (b) to be sufficiently trained in RLA methodologies, software applications and the interpretation of findings.

A second goal which can be accomplished is to provide counties with an efficient option to examine particularly close contests initially which would not require the time and cost of an official recount. However, a full recount could follow should it be necessary.

Another important goal of the Indiana RLA pilot program is to demonstrate confidence in DREs equipped with VVPATs. Since the initial plan by the State is to equip a proportion of DREs with VVPAT in several counties, we propose to accomplish this goal by conducting RLAs on this set of VVPAT DREs (or an appropriate proportion thereof, to be determined) to make inferences

and generalizations to the remaining county equipment inventory. In this scenario, DREs with VVPATs would be treated as a sample for purposes of generalization. The next section discusses the principles of sample, populations and confidence for the purpose of describing how inferences are made from samples to populations in order to demonstrate the above scenario.

Samples, Populations and Confidence

The use of samples to infer confidence in findings in populations is a well-established scientific and methodological principle in the social and behavioral sciences including Political Science. Public opinion polls, studies of attitudes and beliefs, and pre-election polls to determine which candidates are favored all use samples to generalize to populations. It is not realistic, nor is it necessary in most instances, to study an entire population of any entity, whether it be people or equipment, in order to have confidence that the findings from a sample represent what would be found in a population.

In addition to the use of such inference in the social and behavioral sciences, it is also common in the election field. For instances, this is done when electronic poll books and voting systems are tested in Voting System Test Laboratories (VSTLs). In these instances, a few units, sometimes two or three, are tested in the VSTL. Given the same hardware, software and firmware are used for the tested units as would be used for the manufactured and fielded units, the VSTL infers from the tested units that the units used in counties for election activities will behave and function in the very same manner. This same principle is used when VSTOP conducts its field tests of equipment after lab testing is complete. In these instances, just as the VSTL testing, vendors bring units for testing which are representative of the equipment that will be marketed and sold within the state.

There are other instances in which the principles of making inferences for purposes of establishing confidence from samples to populations are used. First, public tests in Indiana require that counties randomly select equipment for testing with VSTOP's help. Not all equipment is selected. Rather, a representative sample of equipment is selected at random in a county for a public test to demonstrate to the citizenry that the equipment operates as required. The sample of equipment tested provides confidence to the public that the other identical equipment in a county's inventory will operate in the very same fashion. A second example comes from the random audit procedure carried out by VSTOP. In that process, VSTOP randomly selects a certain proportion of equipment, using a multi-stage cluster sampling approach, to assure that vendors and types of units are equally represented in order to test to operability and functionality of county equipment. This process only involves a certain proportion of equipment in the state, because it can be inferred from the audits of the units selected randomly represent the operability and functionality of the units not audited.

The aforementioned has been discussed in order to argue that the selection of a certain proportion of VVPAT equipped DREs in the state can provide a comfortable degree of confidence that other, similar units would operate and function in the very same manner.

RLA Training

The RLA program can leverage virtual training, how-to guides, step-by-steps, checklist-based procedures, reports of RLAs conducted, existing written resources and videos to help facilitate the program. A variety of such materials have recently become available.

VSTOP believes the most efficient initial way of training counties on RLA methods would be for our Team to travel to designated individual pilot counties (much like VSTOP did in Marion and Porter counties). Eventually, our goal is to train groups of counties in larger regional or centrally located training sessions. When training groups of counties, VSTOP would like to leverage regular conference attendance at various conferences (e.g., clerk conferences, IVRA, etc.). This plan would involve shepherding the RLA process with pilot counties as part of the training initiative. VSTOP would also like to involve some RLA technical consultants as part of this effort. Please see the Budget section below for VSTOP's plan to hold training sessions.

Leveraging Indiana Stakeholders

There are some key stakeholders in Indiana who might be leveraged to assist with RLA training needs. These include the current CEATS participants, Marion County election personnel and the Porter County Clerk and her staff. Each of these groups have been exposed by VSTOP, in person, to RLAs within the last 14 months.

As pilot RLA counties are trained, these individuals might also serve as resources. VSTOP proposes to involve these individuals in the training process from the very beginning. VSTOP will share with this group draft versions of training materials and how-to-guides for review and feedback. It would also be ideal to involve this group in training sessions.

We propose that an RLA Committee or Task Force be created. Such a group can meet with VSTOP to assist with the recommendation of changes to the overall RLA process, policies, and that committee could help provide assistance to counties in connecting them to resources, assisting with questions, etc.

County Selection and RLA Cadence

County Election Boards (CEBs) may request of the Indiana Secretary of State to be designated as an RLA pilot county and must pass a resolution in order to initiate this process. The RLA program should focus on RLAs to take place after the Primary and General in 2020 and also options on the cadence of RLA's post 2020. VSTOP is available to contact RLA-eligible counties to describe the RLA process and invite those counties to participate as designated counties through CEB resolutions. The RLA program will include some options in terms of cadence, county selection and county rotation. In 2020, one possibility is to conduct one RLA in each congressional district after the 2020 Primary and General Elections.

Budget and Timeline

The state has requested that VSTOP submit a budget for the RLA program through June 30, 2021. The proposed budget is presented below. In January 2019, the Indiana Legislative Services Agency requested that VSTOP to provide cost estimates for RLAs. Based on those numbers, the Fiscal Impact Statement for SEA 405 listed an estimated cost of \$183,000 for 20 pilot counties, or \$9,150 per county. These amounts include preparation costs, RLA implementation costs and travel costs for the RLA team. The estimated costs below are derived from this source.

Table 1 shows the cost for the 2020 RLA pilots in 9 counties that cover each of the Indiana Congressional Districts. It is proposed that RLAs be held in 4 counties after the 2020 Primary election and in 5 different counties after the 2020 General Election. The Primary and General

Election counties have been selected to provide some geographical balance as well as a mix of ballot card and DRE VVPAT counties.

Table 1: Short-Term Budget (2020 Primary and General Elections)

Congressional District	Counties by Vendor (as of July 14, 2019)*	# of RLA counties	Potential Counties*	Voting System Type	2020 Primary/General	Estimated Cost**
First	ES&S -1 MicroVote – 2	1	Any of the MicroVote Counties	VVPAT DRE	Primary	\$9,150
Second	Dominion – 1 ES&S – 2 MicroVote – 7 Unisyn – 1	1	Any of the ES&S and Unisyn Counties	Ballot Card	General	\$9,150
Third	Dominion – 1 MicroVote – 11	1	Any of the MicroVote Counties	VVPAT DRE	Primary	\$9,150
Fourth	Dominion – 6 ES&S – 2 Hart InterCivic – 1 MicroVote – 6 Unisyn – 1	1	Any of the ES&S and Unisyn counties. Dominion has one OpScan county	Ballot Card	General	\$9,150
Fifth	ES&S – 2 MicroVote – 5	1	Any of the MicroVote Counties	VVPAT DRE	Primary	\$9,150
Sixth	Dominion – 3 ES&S – 5 Hart InterCivic – 2 MicroVote – 9	1	Any of the ES&S counties. Dominion and Hart InterCivic has one OpScan county each	Ballot Card	General	\$9,150
Seventh	ES&S – 1	1	Marion	Ballot Card	General	\$9,150
Eighth	Dominion – 1 ES&S – 4 Hart InterCivic – 1 MicroVote – 12 Unisyn – 1	1	Any of the MicroVote Counties	VVPAT DRE	Primary	\$9,150
Ninth	Dominion – 1 ES&S – 2 Hart InterCivic – 3 MicroVote – 5 Unisyn – 2	1	Any of the ES&S counties. Hart InterCivic has two OpScan counties.	Ballot Card	General	\$9,150
Total		9				\$82,350

*Detailed list of Congressional districts by County, Vendor and Voting System Type breakdown available in Appendix G.

The proposed budget from January 1, 2020 through June 30, 2021 is presented in Table 2. The average cost per county is estimated to be the same as in 2020. However, this may have to be revised upward slightly in later years.

Table 2: Budget for 2021 (through June 30, 2021)

Types of Voting	Number of RLA Counties	Number of RLAs (2021 Primary)	Estimated Cost per RLA	Estimated Total Costs for RLAs
Ballot Card	2	2	\$9,150	\$18,300
DRE with VVPAT	2	2	\$9,150	\$18,300
Total	4	4	\$9,150	\$36,600

Table 3 shows a detailed plan of the numbers of DRE VVPAT and OPSCAN counties to be audited during January 1, 2020 - June 30, 2021. We believe that 9 or 10 counties per year (both primary and general) is a reasonable RLA load. It is expected that each county would have conducted an RLA by the end of this period. The numbers are based on the current distribution of DRE and OPSCAN counties. However, changes may need to be made to accommodate for possibilities such as some counties moving to new or different voting systems.

It should be noted that RLAs can be conducted in counties during given years even if the county has not had an election during the year planned for the RLA. Since election materials must be retained for a 22-month period based on federal and state law, RLAs can be conducted in certain counties on elections held in the previous year.

There is a possibility that some counties in the cadence may not have a municipal election in a given year. This came up in a conversation with IED. In such an instance, the county would simply conduct an RLA on the previous year's election or elections since the paper record from the VVPAT would need to be retained or 22 months by law.

Table 3: Numbers of RLA counties by year (through June 30, 2021)

Year	Primary		General		Total/Year
	# OS Counties	# DRE counties	# OS Counties	# DRE counties	
2020	2	2	3	2	9
2021	2	2	0	0	4
Totals	4	4	3	2	13

As mentioned above, VSTOP proposes to conduct general training sessions for groups of counties in the off-election years of 2021, 2023 and 2025 and 2027. The training sessions will be designed to introduce counties to the RLA fundamentals and procedures for conducting such post-election audits so counties may begin the work of preparing for them. It is proposed to bring groups of counties together at a central location for this purpose. As mentioned earlier, one possibility would be to organize such sessions around the IVRA meetings, the December Election Administrators meetings, and the north and south clerk's conferences held within the state. Table 4 shows a budget based on five (5) training sessions held for multiple counties over a period of five (5) years. The estimated costs include the expense of accommodations and meals for the trainees. In addition to the training sessions for groups of counties, VSTOP will be available to consult with counties on RLAs should this be needed.

Table 4: Training Session Budget for 2021 (through June 30, 2021)

RLA Training Year	Years for County Level RLAs	Number of Counties to Train in Each Training Session	Training Cost Per County	Total Training Cost
2021	2021/2022	18	\$1,000	\$18,000
Total		18		\$18,000

The above cost estimates for RLAs do not include expenses for external technical consultants VSTOP proposes to bring in to help with VVPAT RLA complexities. Table 5 provides a cost estimate for such external consultants. We estimate the cost per trip for an external consultant to be \$3,000 (travel, accommodation, meals and local travel and two days (16 hours) of consultant fees at \$95.11/hr.). For 2020, we have 9 trips for the 9 Congressional districts in Table 1. For 2021 (through June 30th) we have 1 trip for the training session shown in Table 4. Total external consultant costs are summarized in Table 5. In our discussions with EAC, we have received assurance of some technical assistance from EAC personnel. We expect that EAC may bear some travel costs in this case. In such an instance, this would reduce some costs reflected in Table 5.

Table 5: External Consultant Costs 2020-2021(through June 30, 2021)

Category	Cost
9 RLAs for 2020 @ \$3,000	\$27,000
1 Training Sessions for 2021 @ \$3,000	\$3,000
Total	\$30,000

Table 6 presents the total budget costs which add the costs from Tables 1, 2, 4 and 5.

Table 6: Total Budget Costs 2020-2021 (through June 30, 2021)

Category	Cost
2020 RLA Pilots (from Table 1)	\$82,350
2021 RLAs (from Table 2)	\$36,600
Training (from Table 4)	\$18,000
External Consultants (from Table 5)	\$30,000
Sub-total	166,950
Deduction (see addendum below)	\$39,565
Total	\$127,385

Addendum to Budget

Based on the proposal to the Indiana Secretary of State, “Additional VSTOP Budget Request related to cybersecurity,” the budget in this proposal would be reduced by a total of \$39,565 in order to compensate for a portion of the 1.5 year salary for the Audit Specialist to cover her/his RLA activities for all of 2020 and half of 2021. The Audit Specialist will carry out other duties in addition to RLA work.

Summary

This proposal discusses many critical aspects of risk-limiting audits. The reader is provided with an overview of RLAs, what have been carried out thus far in Indiana, and a strategy and justification for carrying out RLAs in both the short and long-term within the state. Best estimates of budget figures are provided for RLA activities through June 30, 2021.

Addendum #1 to the RLA Proposal (April 6, 2020)

The Indiana Secretary of State requested that VSTOP provide an addendum to the original and subsequently revised RLA proposals given the likely impact of COVID-19 on the Indiana Primary Election of 2020. There are two factors which will likely impact the Primary. The first is the date of the 2020 Primary Election which has been moved from May 5, 2020 to June 2, 2020 (Indiana Election Commission Order # 2020-37). The second factor is the step to move away from in-person voting and using a mail-in absentee voting process throughout the state. Both of these factors are intended to protect Indiana voters while also not unnecessarily delaying the 2020 Primary for an extended period of time.

The VSTOP Team had originally proposed to begin conducting RLAs after the 2020 Primary once the May 2, 2020 elections are certified. This will now be delayed by a minimum of one month. We had also anticipated conducting all four of the RLAs for the 2020 Primary in counties which are equipped with MicroVote VVPATs. The original plan was to conduct RLAs which would have included the use of the MicroVote Rewinders in four selected counties.

With these developments, VSTOP is proposing a few modifications to the RLA proposal. The first modification pertains to the start of post-Primary RLAs. At this point, given a June 2nd Primary, conducting RLAs probably cannot be started until July 1st. A second modification involves the selection of counties and voting systems for the post-Primary RLAs. The first modification involves simply delaying the start of the RLAs until after the elections in each selected RLA county are certified. The second modification involves a re-working of the selection of counties for the first round of RLAs.

Given the likely move to all mail-in absentee ballot voting for the Indiana 2020 Primary, this negates the ability to test the MicroVote VVPAT in conjunction with the Rewinder. Put simply, it does not look like there will be any in-person voting for the Primary which would involve the use of MicroVote VVPAT. The original plan was to conduct all four post-Primary RLAs in MicroVote counties which have this equipment deployed. Now, given the probability of mail-in absentee voting this equalizes all of the vendors for purposes of conducting RLAs. In every county paper absentee ballots would serve as the one and only VVPAT.

Table 1A (on the next page) is modified from the original Table 1 in the previous proposal. The modifications to this process appear in the blue highlighted rows within the table. The same Congressional Districts (1, 3, 5, and 8) would be used. However, the vendor selected for each of these counties will be distributed among the vendors certified within the state. Since there are five vendors, and we proposed to complete four RLAs after the 2020 Primary, we selected four counties to use within the selected Congressional Districts among the vendors operating in those counties. No county was selected unless the entire county fell within a Congressional District. The counties selected are: Lake (MicroVote), Steuben (Dominion), Madison (ES&S), and Vigo (Unisyn). Also, we still anticipate the ability to train county election officials who would be invited to the RLAs in these counties. A total of nine counties would be training after the Primary and another nine would be trained after the fall General Election.

Table 1A: Short-Term Budget (2020 Primary and General Elections)

Congressional District	Counties by Vendor (as of April 6, 2020)*	# of RLA counties	Potential County	Voting System Type	2020 Primary/General	Estimated Cost**
First	ES&S - 1 MicroVote – 1	1	Lake	MicroVote Absentee Paper Ballots	Primary	\$9,150
Second	Dominion – 1 ES&S – 1 MicroVote – 5 Unisyn – 1	1	Any of the ES&S and Unisyn Counties	Ballot Card	General	\$9,150
Third	Dominion – 1 MicroVote – 9	1	Steuben	Dominion Absentee Paper Ballots	Primary	\$9,150
Fourth	Dominion – 5 ES&S – 2 Hart InterCivic – 1 MicroVote – 5 Unisyn – 1	1	Any of the ES&S and Unisyn counties. Dominion has one OpScan county	Ballot Card	General	\$9,150
Fifth	ES&S – 1 MicroVote – 3	1	Madison	ES&S Absentee Paper Ballots	Primary	\$9,150
Sixth	Dominion – 3 ES&S – 5 Hart InterCivic – 2 MicroVote – 8	1	Any of the ES&S counties. Dominion and Hart InterCivic has one OpScan county each	Ballot Card	General	\$9,150
Seventh	ES&S – 1	1	Marion	Ballot Card	General	\$9,150
Eighth	ES&S – 3 Hart InterCivic – 1 MicroVote – 13 Unisyn – 1	1	Vigo	Unisyn Absentee Paper Ballots	Primary	\$9,150
Ninth	ES&S – 1 Hart InterCivic – 3 MicroVote – 3 Unisyn – 3	1	Any of the ES&S counties. Hart InterCivic has two OpScan counties.	Ballot Card	General	\$9,150
Total		9				\$82,350

With these changes, the VSTOP Team expects a smooth RLA process. There is no reason to believe at this point that the forthcoming RLA process would be disrupted other than uncertainty about the COVID-19 situation which may impact travel to the counties to conduct the RLAs.

Addendum #2 to the RLA Proposal (May 4, 2020. Revised June 4, 2020)

This Addendum #2 is a result of the most recent discussions with the Office of the Secretary of State. Table 1B below shows the four highlighted rows where VSTOP proposes RLAs be conducted for the Primary Elections to be held in May-June, 2020. Our proposal includes three vendors (ES&S, MicroVote and Unisyn) and 4 counties (Elkhart, Jay, Bartholomew and Vigo) from four Indiana congressional districts 2, 3, 6, and 8, respectively.

If one or more of the four highlighted counties in Table 1B cannot participate as RLA pilot counties, VSTOP will return to its equipment inventory list to identify suitable alternate counties in each district.

Table 1B: Short-Term Budget (2020 Primary and General Elections)

Congressional District	Counties by Vendor (as of April 6, 2020)*	# of RLA counties	Potential County	Voting System Type	2020 Primary/General	Estimated Cost**
First	ES&S -1 MicroVote – 1	1	Lake	MicroVote DRE with VVPAT	General	\$9,150
Second	Dominion – 1 ES&S – 1 MicroVote – 5 Unisyn – 1	1	Elkhart	ES&S OPSCAN	Primary	\$9,150
Third	Dominion – 1 MicroVote – 9	1	Jay	MicroVote DRE with VVPAT	Primary	\$9,150
Fourth	Dominion – 5 ES&S – 2 Hart InterCivic – 1 MicroVote – 5 Unisyn – 1	1	Any of the ES&S and Unisyn counties. Dominion has one OpScan county	DRE and/or OPSCAN	General	\$9,150
Fifth	ES&S – 1 MicroVote – 3	1	Madison	ES&S OPSCAN	General	\$9,150
Sixth	Dominion – 3 ES&S – 5 Hart InterCivic – 2 MicroVote – 8	1	Bartholomew	MicroVote DRE with VVPAT	Primary	\$9,150
Seventh	ES&S – 1	1	Marion	ES&S OPSCAN	General	\$9,150
Eighth	ES&S – 3 Hart InterCivic – 1 MicroVote – 13 Unisyn – 1	1	Vigo	Unisyn OPSCAN	General	\$9,150
Ninth	ES&S – 1 Hart InterCivic – 3 MicroVote – 3 Unisyn – 3	1	Brown	DRE and/or OPSCAN	Primary	\$9,150
Total		9				\$82,350

Upon review and approval from the Secretary of State, VSTOP will work with the Secretary on finalizing counties for the RLA pilot program. It is VSTOP’s hope that the four RLAs can be completed during the month of July 2020.