Question - Does the vendor retain ownership rights in the .las files, viewer tool, etc. or is the State of Washington (SoW) looking to own the data and tools?
   a. Is SoW willing to consider licensing the data and tools?

Answer- SoW is looking to own the data (all LiDAR, imagery, and associated metadata). As this is an evaluation of the technical and fiscal impacts to SoW, we would be open to considering options for tool ownership and data accessibility agreements.

Question - Does the State of Washington (SoW) require sublicensing rights for the vendor data and/or viewer tool?
   a. If so to whom does SoW intend to sublicense the technology?

Answer- Not in the intended scope of this RFQ effort.

Question – Does the viewer tool require a navigation routing engine?
   a. Ref: “The viewer shall include navigation options for increasing and decreasing directions of each state route based on Mile Posting…”
   b. The addition of a routing engine will add cost and timing to our proposal.

Answer- Clarified RFQ. SoW users need to navigate along the corridors and identify where they are in the viewer using milepost values. If that requires a navigation routing engine, then it should be included with a comparison of available solutions that do not need a navigation routing engine.

Question – Does the state require the data to be processed and delivered in 1-year contract period of performance? Or just acquired in one year? Please elaborate.

Answer- all delivered in 1 year

Question – Could the state please provide the control network in kml format for planning purposes?

Answer- Yes once they are identified and placed.

Question – Should the vendor require more control to meet accuracy specifications in select areas, would the state do the field survey, or would the vendor be tasked with this work under the same contract?

Answer- WSDOT will set additional targets

Question – Please confirm the deliverable product is only raw, unclassified lidar and imagery with no additional classification or histogram stretching? - Adam help w/ this one...what kind of image enhancement is capable with this system and what is “bare minimum”?
Answer- The LiDAR dataset does not need to be classified but needs to include the intensity/reflectivity value to be able to differentiate paint stripes and other features. The imagery should not need to be enhanced.

Question – What "standard computer hardware platforms" does WSDOT anticipate using with the deliverables?

Answer- For base/"standard" users (not large scale feature extractors) including reviewers, planning, and engineering staff: currently Intel 11th gen i-7, 16GB RAM, onboard graphics card. Specialized users will have more.

Question – Is the state willing to consider a relaxed sun angle window proposal?

Answer- Holding 20 degrees per RFQ. Intent is to prevent bad imagery due to sun location in relation to camera lens– direct in-line sun = bad imagery.

Question – Is there a vendor who has already performed this work in the past for WSDOT?

Answer- No. Localized projects, not to this scale.

Question – Would the state extend the deadline for proposals another week to 8/17?

Answer- Yes

Question – When do you expect to issue a fully executed agreement as this could affect acquisition season.

Answer- Anticipate October time frame. Target setting to be complete prior to data collection.

Question – Will the targeting be completed before the project begins, if so what input is expected of the consultant to direct the placement of the targets? Is the targeting already complete? If so, what is the spacing? If complete, can we get details on target size, material, orientation and coordinates?

Answer- Yes, WSDOT is currently setting targets and with a completion date estimated by Mid November and before the collection starts. WSDOT anticipates setting additional targets to support the statewide collection. Spacing: 2-lane roads every even 5 miles. Divided highways every 5 miles each direction staggered 2.5 miles. MLidar targets are 1ftx1ft thermoplastic material or existing feature points such as: Grate inlets, catch basing, channelization(stop-bars, turn arrows etc) sidewalk or ADA ramp corners etc. Coordinates will be provided by WSDOT in WA S NAD 83/11 (12b) US Survey Foot datum.

Question – Some of the distances between the reference stations are more than 30 miles. Would WSDOT allow for supplementation of local base stations to ensure the data meets the accuracy specified in this RFQ?
Answer- Yes to adding additional base stations. Existing base stations include CORS and WSRN.

Question – How long is the consultant required to manage the data on the Cloud base system? Is there a potential plan for WSDOT to manage this data in the future?

Answer- Depending on the functional needs of the viewer (proprietary or stand-alone) to interact with the LiDAR data and imagery, a minimum of 2 years hosted on vendor cloud. WSDOT intends to store on Agency cloud solutions once the analysis is complete and we have an adequate solution.

Question – Is the expectation that collection will include imagery from all six cameras, and ladybug 5+ camera?

Answer- Yes. Lady bug = 360 imagery for viewer, 6 cameras for LiDAR/Imagery orientation. Vendor will need to demonstrate using the 6 HD cameras for the viewer 360-degree imagery as an alternative.

Question – The requirement of 50mph will impede traffic in certain areas. Is there any negotiation on the 50mph speed limit maximum, especially in high speed/high traffic volume areas?

Answer- Minimum requirements of data integrity and quality dictate speed based on our experience with quality/density degradation at higher speeds. The consultant/vendor would need to prove no impact to data integrity and quality at higher collection speeds.

Question – Will the raw data also be expected to be accessed via the cloud-based server? Or only the final published LiDAR data and imagery?

Answer- As this is an evaluation, once the process has been completed with the LAS and imagery data delivered, WSDOT evaluates the quality and the impacts – storage, etc. the raw data may be provided to WSDOT for backup purposes as determined by the Agency and vendor.

Question – Can you clarify the 18,600+ miles? Is this the estimated number of collection miles based on the collection parameters outlined in the RFQ?

Answer- Yes. There are approximately 18,600+ lane miles. That would address multi-pass corridors for estimation but would likely be more than driven for collection.

Question – Re: Cloud Requirements 2 and 3 (“WSDOT team and users must have access to final published LiDAR (LAS) data files and imagery files” and “Viewer must utilize the cloud stored LiDAR and imagery data directly.”): Final published LiDAR (LAS) data files are not optimized for cloud viewing. Is it acceptable for the vendor to store and publish a cloud-optimized version of the LiDAR data files separate from the final published LAS data files, as long as both versions are hosted in cloud storage within the United States and accessible to the WSDOT team via a cloud solution?
Answer- Yes. LAS files for point cloud work are anticipated to be read-only downloaded to local machines by various business groups within the Agency for feature extraction and terrain development purposes. The viewer could use a cloud-optimized version of the LiDAR data along with the imagery. WSDOT would review the storage requirements and transactional usage of both situations.

Question – Re: The viewer shall include navigation options for increasing and decreasing directions of each state route based on Mile Posting per the WSDOT Linear Referencing System and measurement functionality utilizing the LiDAR data. Does WSDOT require the cloud viewer to provide single-click navigation from mile post to mile post? Or does the ability to navigate freely in the corridor while viewing labels for each milepost in a 2D map, spherical imagery viewer, and/or 3D view meet the requirement?

Answer- WSDOT is looking for the ability to navigate freely along a selected corridor with the current mile post and direction (increasing/decreasing) displayed, but also to enter a milepost and direction (increasing/decreasing) to jump to.

Question – Re: Survey Grade, Time of flight, Dual Head Scanner with adjustable 6 HD Cameras (two located in the front, two on the sides and two in the rear): Does WSDOT require viewing images from all 6 images captured at a single location simultaneously in the cloud viewer? Or does the WSDOT team plan to select and view 1 relevant image for viewing at a time?

Answer- Yes in a 360-degree view approach

Question – My company xxxxxxxxxx started with the intention of remote data collection of LiDAR on autonomous vehicles and expanded to fixed infrastructure. We have a patent application for the retrieval of LiDAR data from disparate environments using cellular networks and into a cloud or bare metal solution. we also work closely with every major LiDAR manufacturer and can help supply LiDAR sensors if needed. If you already have a LiDAR provider, what make and model is being used?

Answer- We don’t currently have a mobile LiDAR provider.

Question – Our system is a plug-and-play NEMA enclosed IP66 weather-rated product and I would like to learn about how we can ensure our bid will be best received. I am not used to submitting government contracts and would like to know if there is a format or presentation that is preferred outside of the forms shown on the RFQ page.

Answer- As noted in the RFQ- Note: Submitters may want to consider setting your email to automatically receive a “Delivery/Read Receipt” for confirmation purposes, as WSDOT will not respond with notification of receipt. PDF format is the required submittal format.
Question – Additionally, in order for me to price this job accordingly, I would like to know how many fixed locations and moving units will be needed for this project as this was unclear in the RFQ.

Answer- Time and budget drive the necessary resources to be used to accomplish this project. The Agency is asking for your estimate of the moving units (we are not including static LiDAR on this project), resources, and subsequently cost, needed to provide the project requirements.

Question – What is the purpose/use case of requiring redundant camera systems (6HD Cameras and Ladybug 5+)

Answer- Ladybug spherical imagery for viewer functionality and HD to capture features including pavement and all would be georeferenced with LiDAR. If HD camera images can be stitched together to provide the same product, the vendor must demonstrate at their risk and cost.

Question – If the point density requirements can be met or exceeded, is it necessary also comply with the collection speed requirement <=50mph?

Answer- Minimum requirements of data integrity and quality dictate speed based on our experience with quality/density degradation at higher speeds. The consultant/vendor would need to prove no impact to data integrity and quality at higher collection speeds. Need to be proven at consultants’ risk and cost.

Question – Requirements indicate there is a need to make available
1. the raw (unprocessed data) please confirm this is referring to the unprocessed data from the collection vehicle prior to geo-rectification.
2. processed data (not published)
3. final published data (QA approval by Washington DOT).

It is our understanding that only the final published data is to be stored on the cloud service, is this understanding correct? If this is correct, how does WSDOT want the additional data deliveries provided.

Answer- After processing (geo-rectifying) is complete, raw data may be provided to WSDOT via an alternative storage solution. The published, geo-rectified LiDAR and imagery data will be on the cloud solution for Agency user consumption. The viewer may be cloud/web based, or stand-alone.

Question – What are the mile postings referred to in the viewer application requirements "The viewer shall include navigation options for increasing and decreasing directions of each state route by mile posting per the WSDOT linear referencing system". A review of the increasing and decreasing linear referencing system data provided by WSDOT did not indicate any attributes to indicate this information.

Answer- Updated link in RFQ. The below link includes LRS event points with included metadata indicating route, ARM, SRMP, and direction of each point at 100th of a mile increments. https://wsdot.maps.arcgis.com/home/item.html?id=34712efbb67e47438c47157dee12a4ae
Question – Whom needs access to the provided viewer tool, is this for WSDOT only, or is it intended to be made public for general use?

Answer- Internal WSDOT use only.

Question – If the viewer tool is required to use only the "cloud stored LiDAR imagery data directly" is it accurate that the viewer does not need to function on any of the data deliverables other than this published data (as an example pre-published data, raw data)

Answer- That is correct

Question – If toll booths are present on an in scope road can the specified collection requirements be maintained per the number of lanes of the road, or is collection of each individual toll lane required?

Answer- Regardless of toll booths/roads, we need all applicable roadways collected per Collection Conditions requirements in RFQ.

Question – For what duration of time does the cloud data need to be hosted

Answer- Depending on the functional needs of the viewer (proprietary or stand-alone) to interact with the LiDAR data and imagery, a minimum of 2 years hosted on vendor cloud. WSDOT intends to store on Agency cloud solutions once the analysis is complete and we have an adequate solution.

Question – Are there requirements as to the method the viewer tool is provided (i.e. web/cloud based, individual executable etc.)

Answer- WSDOT is open to web/cloud based or stand-alone application.

Question – If the point density and requirements can be met with a single head scanner, what is the purpose or use case for requiring a dual head scanner?

Answer- Revised RFQ to be deliverable requirement oriented rather than specify equipment. In our experience, single head scanner cannot cover all features at level of density required by internal business unit needs. Need to be proven at vendor risk and cost.

Question – How much data needs to be viewable at a single point in time in the viewer application

Answer- Included in RFQ Production Deliverables item 10 – at least 50 feet in all directions from current viewpoint.

Question – Over what maximum distance does the measuring functionality need to function in the viewer application

Answer- As we intend the measurement functionality incorporates the LiDAR point cloud, we anticipate at least 50’ in all directions from the current viewpoint.
Question – Many requirements are vague, are we allowed to submit our assumptions for these to protect for unlimited change is scope, or is it expected that the DOT’s interpretation of these must be satisfied with no restrictions. Example: minimizing shadows is a project requirement, and any area of large shadow must be recollected (what is the definition of minimized shadows, and what is the definition of a large enough shadow that it requires recollection).

Answer- A large shadow may include (but is not limited to) an adjacent commercial vehicle that stays along-side the data collection vehicle for an extended period of time blocking the equipment from a clear view of the roadway. Or the sun angle creates a large dark enough shadow in the terrain that prevents the cameras from picking up needed features. Project requirements intent is to get consistent quality imagery and point density across roadway prism per “Collection Expectations”. If large vehicles, other obstructions, sun orientation, or a combination of factors prevent those requirements, recollection is required.

Question – If while driving per the required patterns identified in the "collection conditions" requirements related to number of lanes, road division etc. there is a condition where the requirement "the survey will require complete and consistent collection of the roadway prism from edge of pavement to edge of pavement" is not met. Is it the contractors responsibility to recollect at no additional cost.

Answer- Yes. If the Collection Expectations are not met (including but not limited to: Point Density D=>20 points/sq ft (minimum)), additional passes will be required. All identified and required re-collection efforts will be at no additional cost to the State.

Question – Are there any specific cloud security requirements that we are expected to meet, beyond what is in the RFQ document.

Answer- Included Washington State OCIO cloud storage guidance documentation link and minimum requirements per that document in RFQ.

Question – it is specified that las is to be provided in 1000X1000 ft blocks along the DOT provided LRS centerline. Is there a minimum swath width?
are we able to clip the data on either side of the centerline / vehicle x number of meters?
Is there a required naming convention for the blocks (required prefix, numbered by direction etc?)?
is the DOT centerline ensured to be accurate and up to date with all roads where data aquisition is being requested (there are no real world geometric changes due to construction not represented in the LRS geometry)?

Answer- 1) LAS data will be used for terrain development so requirements should be 1000’ longitudinal blocks but no transverse (side-to-side) clipping. 2) LRS is based on lane path (typically outside lane) not Construction or R/W alignments.

Question – For the following requirement: “The Consultant shall submit calibrated images acquired by the on-board LiDAR system cameras. In addition to the image files, the following information will be given for each image: • Px = 5 pixels; WxH = 2452 x 2056 pixels; FOV = 80 x 65 degrees • Camera/Lens model (unique to each
camera/lens pair for best results) • Camera Location (project coordinates for each image) • Camera Orientation (defined with respect to project reference frame)

can this be provided as an external file such as a csv, or does this need to be embedded in the image header? Is "the Px = 5 pixels; WxH = 2452 x 2056 pixels; FOV = 80 x 65 degrees" an example of format or a specification?

**Answer**- Clarified RFQ in Collection Expectations > Imagery Requirements. Metadata information should be embedded in the image header. WSDOT would need to post-process the metadata from an external file in order to use the images in our processes.

Question – It is required to deliver the imagery in JPEG format or as determined by the WSDOT-consultant project team, is there a particular compression ratio or file size limit?

**Answer**- Clarified RFQ – Collection Expectations > Imagery Requirements

Question – what is considered appropriate for the following requirement: "Coordinated\aligned LAS files and Imagery data organized and sized appropriately to support production computer capabilities"?

**Answer**- The first bullet in Production deliverables should also cover the production hardware capabilities. 1000’ along the corridor not to exceed 1GB for the published LiDAR LAS files.

Question – Do they want the data processed to a specific epoch like 2010, Or to collection date?

**Answer**- Collection date

Question – If the Contractor Certification form CANNOT certify that "NO MANDATORY INDIVIDUAL ARBITRATION CLAUSES AND CLASS OR COLLECTIVE ACTION WAIVERS FOR EMPLOYEES. " does this automatically preclude any consideration of the entire submittal?

**Answer**- Yes

Question – Will the selected firm for this work be disqualified for competing on future contracts for other services (survey, engineering, etc.) on any of the State owned/maintained routes for which they will be gathering data/imagery?

**Answer**- It is not anticipated this work would preclude the Consultant from future work. Please review the OCOI manual for answers to conflict of interest questions.

Question – Will WSDOT set and survey all required control targets in-house, or will this work be completed by other Consultants?

**Answer**- WSDOT will be establishing all control targets and or existing feature points for orientation and anticipates the potential need to put additional targets out.

Question – Assuming control targets will be set and surveyed (horizontal and vertical) by others, will the selected firm be held liable for cloud inaccuracies based on insufficient targets (number of targets, location and accuracy).
Answer- WSDOT will be establishing all control targets and or existing feature points for orientation and anticipates the potential need to put additional targets out. Identified inaccuracies will be discussed and resolved between WSDOT and the Consultant.