

Guidelines for Procurement of Professional Aerial Imagery, Photogrammetry, Lidar and Related Remote Sensor Based Geospatial Mapping Services

EXECUTIVE SUMMARY

These *Guidelines* were prepared by the ASPRS Procurement Guidelines Committee, an ad hoc committee appointed by the ASPRS leadership. The Committee included representation from the ASPRS Professional Practices Division, ASPRS members from state and federal government, the **Management Association for Private Photogrammetric Surveyors (MAPPS)** and the **American Congress on Surveying and Mapping (ACSM)**. These *Guidelines* were formally approved by the ASPRS Board of Directors at their meeting in _____.

The intent of these *Guidelines* is to provide both public agencies and private entities with a resource they can use to assist in their interpretation of the specific procurement regulations that govern their organization's work.

The ASPRS Procurement Guidelines Committee has formed the following conclusions:

- Services are considered to be "Professional Services" when they require extensive specialized knowledge, training and skill to perform; affect public health, safety and welfare; require independent judgment and autonomy in process; and have an expectation of accuracy and ethical conduct to ensure that final deliverables best meet the recipient's interests (i.e., the service provider is responsible for the completeness, quality and accuracy of the final project deliverables).
- "Professional geospatial mapping services," as used in these *Guidelines*, include all photogrammetry and related remote sensing applications that determine geospatial positions or interpret, process or analyze remotely sensed imagery and data to create mapping deliverables that have a requirement or expectation of accuracy that could influence decisions that impact the public. Examples include but are not limited to conventional photogrammetry, directly geo-referenced aerial photography, orthophotography, air-borne lidar, ground-based lidar, air-borne or satellite-borne radar elevation data and similar remotely sensed measurement science services.
- Procurement methods that use qualifications as the primary basis for selection serve to protect public interests and are the most appropriate procurement mechanism for professional geospatial services. When price is included as the primary selection criteria, or as one of several critical selection criteria as in many implementations of procurements methods characterized as "best value," responding firms often are forced to use lower standards or to otherwise sacrifice quality of work. This means that quality of the final work product may be compromised and that advanced technologies, the best techniques, and the most effective project approach may not be proposed. Evaluating the firms' qualifications first ensures clients will receive quality services at a fair price and in so doing, best protects the interests of private entities, public agencies, taxpayers and other third parties.
- Professional services outlined in these *Guidelines* play a critical role in the success of engineering, architecture, surveying, planning, natural resources, emergency response and disaster recovery and other services that they support. While geospatial services are frequently done in collaboration with professionals in these other disciplines, it is often the mapping professional who is the only individual involved that has the expertise and experience to fully understand the specifications, accuracies, methodologies and approach that will support the intended end use of the mapping deliverables. Therefore, use of a qualifications-based procurement process when obtaining professional services is critical to ensuring the quality and fitness for purpose of these services.

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- Qualifications based selection is outlined by the Federal law commonly known as the Brooks Act, and is required by law for all federal procurement of photogrammetric mapping services that are related to architecture and engineering, which includes surveying. The Brooks Act provides a model QBS process, requiring: that firms be ranked according to qualifications only; that cost is not a factor in the initial selection of the top ranked firm; and that once a firm is selected based on qualifications, an acceptable scope of work and fair and reasonable cost are negotiated. If a fair and reasonable cost cannot be agreed on with the top ranked firm, negotiations are initiated with the next most qualified service provider. QBS according to the Brooks Act or similar methods is also required for the procurement of surveying services at various levels of government by many state laws, often referred to as “mini-Brooks Acts.”
- ASPRS endorses Brooks Act, and similar, QBS methods for all professional services. Brooks Act QBS methods encourage innovation and design; encourage competition among the most qualified firms; foster a relationship of trust between the client and provider; and allow for negotiations between the client and provider to ensure execution of the most appropriate scope of work at a fair and reasonable cost. In many states, licensed professionals are prohibited from submitting a cost or bid for public work; therefore, procurement methods that do not follow Brooks Act-like procedures may eliminate many of the most qualified firms from competing in a price based procurement.
- It is recognized that geospatial services may be procured within the scope of a more extensive project, wherein the specific geospatial services would be considered “incidental” to the project. In cases where the total dollar value of the geospatial component of the project is small, it is understood that other procurement processes may reasonably apply. However, regardless of the method of procurement for the larger project, or the size of the geospatial component of the project, if the primary contractor utilizes one or more subcontractors to acquire specialized geospatial services, then those geospatial subcontracts are also considered to be subject to these *Guidelines*.
- State licensing laws must also be considered in the procurement of selected professional geospatial services. For instance, many states require a license to practice specific aspects of photogrammetric mapping and other geospatial services. Definitions and regulations vary widely state to state. State statutes may refer specifically to photogrammetric mapping or may regulate mapping under broader definitions of surveying or engineering. Contracting personnel who are more accustomed to the procurement of other types of goods and services, even including more conventional engineering or surveying work, are not always knowledgeable about State laws that apply to geospatial services. Contracting and procurement personnel should contact the State Board of Examiners for surveying and engineering in the state(s) in which the work is to be performed to confirm what aspects of existing survey and engineering statutes apply to their projects. Procurement practices need to comply with any and all state licensing laws.
- State Legislatures may review and modify their licensing laws and/or State Boards of Examiners may modify regulations periodically to address developing technologies and evolving professional practices. To support this process, the National Council of Examiners for Engineering and Surveying (NCEES) has developed a Model Law and associated Model Rules that serve as a guide when modification of applicable statutes is deemed appropriate. The NCEES Model Law and Model Rules consider the application and intent of the work, and not the tools used, as the determining factor in distinguishing between geospatial services that should be licensed and referential services that do not require a license. The NCEES model identifies surveying services as any work, regardless of the tool used, that represents an “authoritative” location or measurement of features on or relative to the earth and which results in a “survey” product. This includes many remote sensing and photogrammetric services, such as controlled aerial photography, stereo feature extraction, orthophotography, lidar surveys and similar tasks.

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- NCEES documents are considered by ASPRS to be the best definitive guideline for determining which geospatial services should require a professional license. In the absence of specific statutory licensing language or precedent for enforcement in a given jurisdiction, procurement personnel are encouraged to use the NCEES Model Law and Model Rules as guidelines to evaluate which services may potentially be regulated under state law. However, the NCEES Model Law and Model Rules are only guidelines for the purpose of assisting state governments in the implementation and interpretation of state licensing laws. The Model Law and Model Rules do not represent enacted legislation and do not have any specific legal authority, unless so enacted in a given state.
- The term "professional services" is broader than, and is not synonymous with, "licensed" or "regulated" services. The procurement recommendations outlined in these *Guidelines* are not limited to those "licensed" services identified by state licensing laws or NCEES Model Law recommendations. The NCEES Model Law was developed to address licensing and not procurement. These *Guidelines* recognize that there are many geospatial mapping applications which require professional knowledge and skill, and which affect public well being, that are not directly tied to engineering, architecture or surveying, and that may not be regulated by licensing laws. Qualifications based selection is appropriate for all professional geospatial services and not just services that require a professional license. It should also be noted that licensed individuals are not always more qualified to perform a specific "professional service" than unlicensed individuals and qualifications evaluation criteria should be applied fairly to all qualified geospatial service providers.
- ASPRS recognizes that QBS is not required by law in all cases, particularly for services acquired by organizations not subject to Federal or State procurement laws, or in some cases where those services may not meet the test for authoritative accuracy that the NCEES model (and many state laws) uses to distinguish between surveying services and other referential geospatial services. When Brooks Act or similar QBS procurement practices are not required by laws or regulation, procuring organizations have the autonomy to select the procurement approach and method that best meets their needs. However, ASPRS considers QBS to be the only appropriate procurement method for all photogrammetry and related remote sensing services that meet the definition of surveying as outlined by the NCEES Model Law and associated Model Rules or by governing State Law for the state or states in which the work is being conducted. Alternative "best value" or other cost-based selection methods are not appropriate for photogrammetry and remote sensing services which meet the NCEES definition of surveying.
- ASPRS recognizes there will be instances where an organization may need to use an alternative procurement method other than QBS. In those cases, ASPRS recommends the following minimum guidelines be implemented:
 - 1) Qualifications should always be the primary selection factor;
 - 2) Qualifications rankings should not be influenced by cost;
 - 3) The scope of work must be well defined and have been developed by a professional who has extensive knowledge of the work to be performed and is qualified to ensure that the scope of work will best serve the public interests;
 - 4) Projects that have a significant element of design, and where the service provider's professional judgment is relied on to develop the scope of work, methodology or approach, should always use QBS and should not include cost as a selection criteria.
 - 5) If cost data is to be required for the selection process, it should be submitted separately and considered only after firms are ranked based on qualifications; and
 - 6) A qualified professional (either on the client's staff or hired as a consultant) needs to be involved in review of both the technical proposal and the cost proposal to ensure the work best meets the end user and public interests.

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- These *Guidelines* for professional geospatial services apply equally to future technologies and are not limited to existing technologies or "tool based" definitions. While specific technical tasks will continue to become more automated with future technologies, the correct and prudent implementation of these new technologies will always require the level of knowledge, expertise, ethical standards and professional conduct outlined in these *Guidelines*. It is the intent of these *Guidelines* that the professional nature of future technologies be judged by the same general criteria that have been applied herein to current technologies.
- Not all geospatial services have the same element of potential public harm that warrants qualifications based procurement methods. Services that may not require qualifications based procurement under these *Guidelines* include services wherein the data is not to be presented to the public in any way that would imply an expectation of authoritative geospatial accuracy or services, and where misrepresentation of geospatial accuracy will not result in harm to the public health, safety and welfare. Some resource aerial photography and GIS-based reference-only mapping tasks fall in this category. Nevertheless, knowledge of geospatial services, accuracy specifications, and the impact on the public is itself included within professional service. Therefore, ASPRS encourages consultation with an ASPRS Certified Photogrammetrist or licensed professional with expertise in the geospatial field to assist in such evaluations.
- Sales of existing "off the shelf" mapping **products** are sold on fixed-cost basis. Products are developed to the provider's specifications and standards, not necessarily the purchaser's or user's. Therefore, QBS methods may not be practical or required for these kinds of purchases. Products are subject to product liability not professional liability. Products may not be certified by a professional, but may be warranted to meet specific standards.
- A glossary of terms, comparison matrix for distinguishing between products, technical and professional services and a comparison chart demonstrating specific examples of professional and technical services are included as attachments to these *Guidelines*.

References:

Brooks Act Procurement Process

ASPRS Code of Ethics

ASPRS Certification Reference

NCEES link to State Engineering/Surveying Boards

NCEES MOTF Report

1986 ASPRS Guidelines for Procurement of Photogrammetric Services

COMPARISON OF PROFESSIONAL SERVICES, PRODUCTS AND TECHNICAL SERVICES

Offering Type/ Differentiators	Professional Service	Product	Technical Service
Level of Standardization	<p><u>Varies</u></p> <p>Service varies from client to client and from project to project. Service standards are established in some vertical markets.</p> <p>Service provider exercises independent professional judgment and quality control.</p>	<p><u>High Standardization</u></p> <p>Provider offers a set of standard features from which the client may choose.</p>	<p><u>High Standardization</u></p> <p>Provider offers a standardized service.</p> <p>Specific methodology prescribed solely by client.</p> <p>Service provider exercises only a minimal level of independent judgment.</p>
Specifications	Set by Client with critical input from service provider	Set by Provider	Set by Client with minimal or no input from service provider
Ownership	In most cases, the client owns all resulting work and deliverables.	In most cases, the provider owns the data and it is offered under license to the client.	In most cases, task is to support subsequent work by the client and client owns all resulting work and data.
Certification / Warranty	Typically certified by a professional in responsible charge of the work, such as a land surveyor, photogrammetrist, engineer or GIS professional. Professional registration or licensure may not be required to oversee the work, as state licensure laws vary widely.	No professional seal or certification. Warranty may be offered by provider that the product meets specified standards.	No professional seal or certification. Client is solely responsible for quality control and for verifying that products meet specifications and expectations.
Protection of Public Welfare	<p><u>Professional liability may apply</u></p> <p>Provider is responsible for quality control and ensuring products meet specifications and expectations. Provider is expected to comply with ethical and professional standards to protect public interest.</p>	<p><u>Product liability applies</u></p> <p>Product developer is responsible for ensuring deliverables meet stated specifications and requirements.</p>	<p><u>No professional liability</u></p> <p>Client is responsible for quality control, ensuring products meet expectations and ensuring products protect the best interest of the public.</p>
Procurement Method	Qualifications based selection	Primarily cost based	Either an evaluation of both cost and qualifications or qualifications based
Pricing	Typically negotiated between provider and client based on level of effort and negotiated rates. May be contracted as fixed price or as cost plus fixed fee.	Published pricing. Total price determined as a function of units times a standard price of the unit.	Estimates may be negotiated based on labor hours times hourly rate or as published pricing per unit.

EXAMPLES OF PROFESSIONAL PHOTOGRAMMETRIC SERVICES

Service Type	PROFESSIONAL SERVICE		TECHNICAL SERVICE
	Surveying, as Defined by NCEES Model Law and Model Rules	May not be Surveying, Depends on State Law	
Aerial imagery (Not Rectified)	<p>IMU or airborne GPS data represented to meet a specified accuracy</p> <p>Conventional aerial photography for photogrammetric mapping; service provider is responsible for project design</p> <p>Service provider provides ground control or aerotriangulation</p>	<p>IMU or airborne GPS when used solely to produce purely referential imagery, not provided as a deliverable and not represented to meet a specified accuracy</p>	<p>Resource photography or mosaics with no published coordinates or geo-reference data</p> <p>Conventional aerial photography; all flight layout and project design is the responsibility of the client or professional in charge</p>
Orthophotography and Rectified Imagery	<p>Represented to meet a specific accuracy</p> <p>Published for public use as rectified imagery meeting a stated or implied accuracy</p> <p>Nearly all orthophotography when used for engineering, planning, natural resources and related work where geospatial accuracy influences decisions that affect public welfare</p>	<p>Not required to meet a specific accuracy</p> <p>Imagery rectified, scaled or rubber-sheeted to USGS or other existing data sources solely for referential purposes</p> <p>Always accompanied by an appropriate disclaimer stating that the imagery should not be used for measuring or locating features</p>	<p>Approximate scaled or rubber-sheeted imagery for display where there is no expectation of accuracy or professional judgment</p> <p>Orthophotography always implies some expectation of accuracy and professional judgment and is never a technical service</p>
Feature Extraction	<p>Represented to meet a specific accuracy</p> <p>Nearly all planimetric, topographic and digital terrain model feature extraction when used for engineering, planning, natural resources and related work where geospatial accuracy influences decisions that affect public welfare</p>	<p>Not required to meet a specific accuracy</p> <p>Referential GIS layers such as inventory maps, resource management boundaries, GIS centerline data and similar applications</p> <p>Always accompanied by an appropriate disclaimer stating that the mapping should not be used for measuring or locating features</p>	<p>Feature extraction always implies some expectation of accuracy and professional judgment and is never a technical service</p>
Lidar, Radar Acquisition and Terrain Modeling	<p>Data is represented to meet a specific accuracy statement</p> <p>Includes nearly all terrain modeling using active sensors such as airborne lidar, ground based lidar, and IFSAR</p>	<p>Not applicable</p> <p>Currently, acquisition of active sensor data for geospatial mapping purposes that does not imply or implement an authoritative accuracy is not cost effective or useful</p>	<p>Active sensors always imply some expectation of accuracy and are never a technical service</p>
Digitizing, Scanning and Processing of Existing Maps or Data	<p>Published for use by the public and represented as survey data depicting the authoritative location of features or boundaries</p>	<p>Scanning, digitizing or formatting existing mapping data, not intended to be survey data, but where the service provider is expected to exercise professional judgment and interpretation to ensure final products are suitable for intended purpose</p>	<p>Scanning, digitizing or formatting of existing mapping data to client specifications where minimal professional judgment or interpretation is required</p>