

ASPRS Guidelines for Procurement of Geospatial Mapping Products and Services

Draft Guidelines

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33 Introduction

34 ASPRS has published two previous procurement guidelines: **Guidelines for the Procurement of**
35 **Professional Aerial Imagery, Photogrammetry, Lidar and Related Remote Sensor-based Geospatial**
36 **Mapping Services (2009)** and the **Guidelines for Procurement of Commercial Geospatial Mapping**
37 **Products (2012)**. These *Guidelines* were developed to address common questions that have arisen about
38 appropriate models and associated procurement procedures for products and services from the ASPRS
39 membership and broader profession.

40 This procurement guideline document incorporates those two existing guidelines, supersedes, and
41 combines those guidelines into this single document entitled **Guidelines for the Procurement of**
42 **Geospatial Mapping Products and Services**.

43 These *Guidelines* seek to inform and guide the reader in the following ways:

- 44 • Provide a clear and updated definition of what characterizes Professional Geospatial Mapping
45 Services (PGMS) and Commercial Geospatial Mapping Products (CGMP).
- 46 • Provide clear examples of PGMS and CGMP covered and not covered in each guideline.
- 47 • Recognize and reference existing Federal and State laws that may govern the procurement of
48 PGMS or CGMP.
- 49 • Review procurement methodologies and best practices as applicable.
- 50 • Provide additional reference materials for the reader as appropriate.

51 Executive Summary

52 The intent of these *Guidelines* is to provide procurer's of geospatial mapping products and services with
53 a resource that they can use as a guide to help determine the best approach and methodology for
54 procuring both Professional Geospatial Mapping Services (PGMS) and Commercial Geospatial Mapping
55 Products (CGMP).

56

57 These *Guidelines* provide a definition of PGMS and CGMP with the intent to highlight the characteristics
58 that distinguish CGMP from PGMS. The *Guidelines* provide criteria to consider when evaluating the
59 procurement of products and services. A matrix outlining these differences is provided in Appendix 1 of
60 these *Guidelines*.

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62 The specific goals of these Guidelines related to procurement of PGMS are to:

- 63 • Provide guidelines for the procurement of PGMS.
- 64 • Define the characteristics that distinguish professional geospatial services (PGMS) from
65 geospatial mapping products (CGMP).
- 66 • Endorse qualifications-based selection (QBS) procurement of PGMS.

- 67 • Recognize that existing state and federal laws regulate profession services and distinguish
68 between:
 - 69 i) Licensed activities that are defined by state law; and
 - 70 ii) Professional services that may not require a license, but are professional in nature as
71 determined by the ultimate use of the services, level of skill required and accepted
72 standards of practice.
- 73 • Provide definitions and guidance that will apply to both current and future technologies.

74 The specific goals of these *Guidelines* related to procurement of CGMP are to:

- 75 • Provide guidelines for the procurement of CGMP.
- 76 • Define the characteristics that distinguish professional geospatial services (PGMS) from
77 geospatial mapping products (CGMP).
- 78 • Define “commercial off-the-shelf” (COTS) CGMP.
- 79 • Recognize, acknowledge, and reference the existence of state and federal laws that may govern
80 the procurement of CGMP as they relate to COTS.
- 81 • Provide definitions and guidance that will apply to both current and future technologies.

82

83 **Recommendations from the Guidelines**

84 For either PGMS or CGMP procurement, the reader is encouraged to undertake a number of steps to
85 implement the appropriate methodology. These include, but are not limited to:

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- 87 • Seeking the assistance and guidance of a professional
- 88 • Pre-proposal research, including requirements definition
- 89 • Market analysis
- 90 • Development of Source Solicitation Package / Request for Proposal
- 91 • Issuance of the Source Solicitation Package / Request for Proposal
- 92 • Evaluation, selection and award

93

94 **Items Not Covered in the Guidelines**

95 Specific procurement methodologies and approaches for the items listed below are not included within
96 the scope of the *Guidelines*. They are only referenced within the *Guidelines* to the extent necessary to
97 define and clarify the distinction between them and the items covered within the *Guidelines*.

- 98 • Procurement of geospatial hardware
- 99 • Procurement of geospatial software
- 100 • Procurement of geospatial technical services

101

102 **I. Background and Intent**

103 The **American Society for Photogrammetry and Remote Sensing** (ASPRS) is the leading scientific
104 professional organization representing the photogrammetry and remote sensing profession. These
105 *Guidelines* represent the best effort of ASPRS at defining and clarifying the key issues that affect
106 procurement of Professional Geospatial Mapping Services (PGMS) and Commercial Geospatial Mapping
107 Products (CGMP).

108 The *Guidelines* were prepared by the ASPRS Procurement Guidelines Committee, an ad hoc committee
109 appointed by the ASPRS Board of Directors. The core members of the Committee included
110 representatives from the commercial / private sector, as well as state and federal government.
111 Committee membership included representation from the ASPRS Professional Practice Division, ASPRS
112 members from state and federal government, the Management Association for Private Photogrammetric
113 Surveyors (MAPPS) and the American Congress on Surveying and Mapping (ACSM), now known as the
114 National Society of Professional Surveyors (NSPS). During the development of these *Guidelines*, the
115 Committee interviewed procurement representatives from State and Federal agencies and private
116 providers of commercial geospatial mapping products.

117 The ***Guidelines for Procurement of Professional Aerial Imagery, Photogrammetry, Lidar and Related***
118 ***Remote Sensor-based Geospatial Mapping Services*** was approved by the ASPRS Board of Directors in
119 August 2009. The ***Guidelines for Procurement of Commercial Geospatial Mapping Products*** was
120 approved by the ASPRS Board of Directors in October 2012.

121 This document entitled ***Guidelines for the Procurement of Geospatial Mapping Products and Services***,
122 combines the previous guidelines and was approved by the ASPRS Board of Directors in [month year].

123 These guideline are not intended to provide strict rules that cover all situations involving the
124 procurement of geospatial mapping products & services. They are intended to provide guidance and
125 context to the user before and during the procurement process.

126 This document is intended to be a ‘living document’ and as such, ASPRS welcomes comments and
127 suggestions in the form of communication to ASPRS with the subject referencing this document.

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129 **II. Distinguishing Between PGMS and CGMP**

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131 **Professional Geospatial Mapping Services**

132 PGMS are those geospatial mapping services that require specialized knowledge and skill; require
133 independent judgment; and have an expectation of ethical conduct and professional expertise such that
134 the resulting services will be consistent with the best interests of the client and public. A detailed
135 definition and distinction of what services are considered professional in nature is presented in
136 Chapter 1, along with recommendations for appropriate procurement methods.

137

138 **Commercial Geospatial Mapping Products**

139 CGMP refers to geospatial map data that are readily available from commercial providers and described
140 as “commercially available off-the-shelf” or COTS (the procurement of geospatial hardware and/or
141 software is not part of these *Guidelines*). This includes existing imagery or mapping data and other
142 maps, data or other geospatial content for which the data provider sets the specifications and licensing
143 requirements. A detailed description of what CGMP encompass is presented in Chapter 2, along with
144 recommendations for appropriate procurement methods.

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Comparison Matrix

The matrix in Appendix 1 compares the characteristics of PGMS to CGMP and CGMP Support as defined in the *Guidelines for Procurement of Professional Aerial Imagery, Photogrammetry, Lidar and Related Remote Sensor-based Geospatial Mapping Services*, ASPRS, August 2009 and the *Guidelines for Procurement of Commercial Geospatial Mapping Products*, ASPRS, October 2012. The matrix in Appendix 1 was modified from the MAPPS Products vs. Services Matrix.

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Chapter 1 Procurement of Professional Geospatial Mapping Services (PGMS)

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I. Definition of PGMS

Professional services are those services that require specialized knowledge and skill; require independent judgment; and have an expectation of ethical conduct and professional expertise such that the resulting services will be consistent with the best interests of the client and public.

Professional geospatial mapping services utilize Geomatics, photogrammetry, and related remote sensing technologies and/or GIS to produce geospatial mapping deliverables and information for which there is an expectation or representation of reliable spatial accuracy, thematic accuracy, or content. Professional geospatial mapping services are broad in scope and are not limited to those tasks that are regulated or licensed by states or other agencies. State laws vary widely and are not consistent in their definitions of which professional geospatial mapping services require licensing. Further, licensure is intended to ensure a minimal level of competence to protect life, health, safety, property and/or the public welfare. Procurement guidelines should meet a higher standard and seek to acquire services that will result in a successful project that best meets overall project objectives and/or public interests.

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II. Characteristics of PGMS

ASPRS considers professional geospatial mapping services (PGMS) to be those geospatial mapping services that:

1. Require specialized knowledge derived from academic education, on-the-job training, and practical experience;
2. Produce mapping deliverables and geospatial information for which there is an expectation or representation of reliable positional accuracy, thematic accuracy, or content;
3. Require independent judgment, ethical conduct and professional expertise to ensure that the resulting maps, data and information derived from these services are consistent with the best interests of the client and/or public and;
4. Could potentially negatively affect life, health, safety, property and/or the public welfare.

183 **III. PGMS Addressed by these Guidelines**

184 These *Guidelines* are specifically intended to apply to those geospatial mapping services that are
185 associated with acquiring, interpreting, processing, analyzing or representing remotely-sensed imagery
186 and data to create geospatial mapping deliverables. This includes services associated with measuring,
187 locating and preparing maps, charts, or other graphical or digital presentations depicting the location of
188 natural and man-made physical features and phenomena of the Earth.

189
190 Photogrammetry techniques / principles / methods and remote sensing are applied in a variety of
191 industries and professions for a very broad range of applications. Many of those applications are not
192 related to geospatial mapping and as such, are not addressed herein.

193
194 The term "professional geospatial mapping services (PGMS) is used in this document in a very general
195 context to refer to a much broader scope of geospatial mapping services than those that involve only
196 photogrammetry and remote sensing. It is the opinion of ASPRS that the principles and
197 recommendations presented in this document apply equally to any geospatial mapping services that
198 would meet the broad definition of "professional services" used herein. However, specifically
199 determining or identifying all geospatial mapping services that should be considered "professional
200 services" is beyond the expertise of the Procurement Guidelines Committee and is beyond the scope of
201 this document. The primary focus of the document is on the photogrammetry, remote sensing and
202 geospatial services that constitute the primary area of expertise of ASPRS and its membership.

203 **IV. Examples of PGMS**

204 This section provides examples of specific task items that meet the definition of "professional"
205 geospatial services. Geomatics, photogrammetric and remote sensing professionals apply rigorous
206 principles of measurement science and remote sensing interpretation to develop reliable geospatial
207 deliverables. Photogrammetric mapping professionals utilize their knowledge and training to employ the
208 appropriate methods and technologies to image, measure, calculate, reduce, and integrate geospatial
209 and attribute data. They then transform this data into mapping deliverables such as vector and image
210 maps, charts, reports, and other graphical or digital representations.

211
212 Photogrammetrists and remote sensing specialists must have in-depth knowledge and expertise in the
213 1) principles of geomatics, 2) sensor technologies and their specific applications, 3) specific processes to
214 be implemented and 4) final application of the project deliverables. Professionals may incorporate
215 commercial geospatial mapping products (CGMP) when appropriate to meet the client's project
216 requirements.

217
218 Photogrammetric mapping deliverables are frequently used to make critical decisions that require
219 accurate and reliable information about the location of features on the Earth. Photogrammetric
220 mapping professionals may provide services directly to a public agency or other private sector
221 professional firms. In the performance of their services, the photogrammetric mapping professional
222 may work in cooperation with other experts such as surveyors, engineers, architects, land managers and
223 planners, remote sensing specialists, cartographers, geographers, GIS specialists, and IT professionals.
224 The photogrammetrist, in direct responsible charge of acquiring and preparing the contracted geospatial
225 deliverables, is often the only professional involved in the project who has the experience necessary to
226 fully understand how to properly implement geomatics, photogrammetry and related remote sensing
227 technologies to support the intended uses of the contracted deliverables. Following are specific

228 examples of some of the many areas of use wherein the accuracy and quality of photogrammetric
229 mapping services directly affects decisions that could potentially impact life, health, safety, property
230 and/or the public welfare:

- 231 1. Engineering design of roads, bridges and public facilities;
- 232 2. Water resources planning and design;
- 233 3. Natural hazards assessment, including landslide assessment, dam site/reservoir assessment
234 and flood hazard mapping;
- 235 4. Emergency services applications;
- 236 5. Municipal planning;
- 237 6. Disaster recovery;
- 238 7. Transportation planning;
- 239 8. Route planning for power distribution facilities

240
241 Some implementations of the tasks listed may be considered surveying by state law, depending on the
242 nature of the work and end use of the project deliverables; other implementations may not meet state
243 law or National Council of Examiners for Engineering and Surveying (NCEES) definitions of surveying, but
244 still require the level of professional expertise and ethical conduct that define professional service. In
245 the opinion of ASPRS, projects and contracts that include any of the following services should use
246 procurement methods that rely on qualifications as the primary selection criteria; the most widely
247 accepted example of which is the Brooks Act Qualifications-Based Selection (QBS) process. The list
248 below provides examples of services for which ASPRS *recommends* a QBS procurement process.

- 249
250 • **Ground Control** - Coordinates established at identifiable locations within geospatial data sets
251 (e.g., imagery, lidar, GIS, etc.) to support the preparation and/or QA/QC of geospatial project
252 deliverables. The coordinate values should include metadata that references the accuracy,
253 collection procedures, methodologies, and/or source data of said locations. Ground control may
254 be considered a professional service as determined through the analysis of individual state
255 regulations regarding the practice of surveying where the work is completed.
256
- 257 • **Aerial Imagery Mission Planning for Orthophotography and Photogrammetric Mapping** - Aerial
258 imagery acquisition (both film and digital) that is intended to be the source for orthophoto or
259 photogrammetric mapping with an expectation of geospatial accuracy is considered a
260 professional service. Flight coverage, equipment/calibration requirements, flight altitude, flight
261 window, overlap and other acquisition specifications directly affect the quality and accuracy of
262 all subsequent mapping tasks.
263
- 264 • **Directly Georeferenced Aerial Image Acquisition Incorporating Airborne-GPS, Inertial
265 Measurement Unit (IMU) or Similar Technologies** - These technologies involve the direct
266 determination, during image acquisition, of some or all of the image georeferencing parameters.
267 Imagery acquisition for which specific coordinate and orientation parameters that are required
268 as a deliverable implies an expectation of accuracy and requires professional services to ensure
269 reliable results that will support intended applications.
270
- 271 • **Analytical Aerial Triangulation** - This process combines the ground control with the sensor
272 metric parameters, and then applies precise photogrammetric measurements to accurately
273 georeference the imagery. The accuracy and reliability of the aerial triangulation process affects
274 all subsequent mapping tasks.

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- **Determination of Topographic, Elevation Model, or Planimetric Feature Mapping** - Point and feature extraction from remotely sensed data for the purposes of mapping topographic features, planimetric features or development of elevation and terrain models have an expectation of accuracy and affect subsequent decisions and activities that affect life, health, safety, property and/or the public welfare. Feature extraction requires precise photogrammetric orientations and measurements, specific knowledge and skill using the photogrammetric mapping technologies and a broad understanding of the intended applications. Professional expertise is critical to adequately represent planimetric, topographic and elevation model features within the contracted accuracies.
- **Digital Orthophoto Mapping** - A digital orthophoto by definition is an image that has been differentially rectified to within a specific 2-dimensional (2D) geospatial accuracy and resolution. Rectifying and georeferencing remote sensing imagery to systematically correct for image orientation parameters, distortion, and earth surface topography requires rigorous knowledge of photogrammetric mapping principles and technologies. Production of orthophotography is considered a professional service if the resulting orthophotography is to be produced to meet a scope of work defined by a specific client or published for use in any application where the reliability of the geospatial accuracy is of critical importance. Such uses may include planning, engineering, natural resources, agriculture, disaster recovery, emergency services, and development of other mapping layers or other similar applications.
- **Lidar Acquisition and Processing**. Lidar is an active remote sensor that emits short wave electromagnetic energy (light), records the reflected return signal, and provides a direct measurement of the location and range (e.g., elevation) of features on the Earth. The lidar sensor must be continuously georeferenced during its operation by use of airborne-GPS and IMU. Extensive knowledge of all these systems, their calibration and operational integration, and related mathematical and physics necessary to post process the data are essential for accurate 3-dimensional (3D) measurement and representation of the Earth's surface. Lidar may be employed from a ground station, aircraft (fixed wing and rotary), moving vehicle or other platform.
- **Radar Measurements for Topographic Mapping**. This well-established technology is similar to lidar in being an active system that directly measures features on the Earth. Modern remote sensing radar systems emit polarized long wave electromagnetic (radio) energy, with the ability to penetrate cloud cover, and record the return signal to create an image of the landscape below. Radar systems have been extensively developed so that they are now measurement systems as well. Utilizing complex technologies such as synthetic apertures and interference pattern measurements, radar topographic data have been collected from aircraft, satellites, and the Space Shuttle. This technology requires specialized knowledge in its use and application for geospatial mapping.
- **Image Interpretations and Thematic Mapping**. Image interpretation and thematic mapping services involve elements of thematic accuracy rather than geospatial accuracy. These applications of remote sensing technology would not be considered surveying by the Model Law definition and, in the absence of a specific state law that may include these services, would not be subject to the federal laws that govern architecture and engineering procurement. However,

322 these services do share the elements of knowledge, skill, expertise, professional judgment and
323 potential impact to life, health, safety, property and/or the public welfare that define a
324 professional level service. While not services subject to Model Law licensure, these services
325 would be considered professional level services as defined in this document.
326

327 **Future Technologies**

328 Geomatics, remote sensing and photogrammetry are very dynamic fields of professional practice. As
329 new technologies become available in the future, geospatial professionals will continue to develop new
330 ways of implementing photogrammetry and remote sensing principles and processes to produce
331 geospatial mapping services and project deliverables.
332

333 Within the past two decades, new sensors, new software and vastly improved computer processing
334 capabilities have dramatically transformed the level of automation in photogrammetric mapping. Many
335 tasks that previously required a highly skilled technician with many years of training can now be either
336 partially or fully automated to the extent that a much less skilled individual can perform that same task.
337 This trend will undoubtedly continue. However, and as stated in previous sections, it is not the level of
338 automation by itself that defines whether or not a service requires professional oversight and
339 supervision. As technology continues to increase the level of automation used to develop mapping
340 deliverables, the professional nature of a service must continue to be evaluated based on the
341 characteristics and intended use of the deliverables, regardless of the technologies or tools used or the
342 level of automation incorporated within those processes.
343

344 As new technologies become available to the geospatial mapping community, it is the intent of these
345 *Guidelines* that the same general criteria applied herein to assist in evaluating the professional nature of
346 current technologies be applied uniformly to new technologies as they are employed by the geospatial
347 mapping professionals.
348

349 **V. Procurement of PGMS**

350 Nothing in this section or in this document is intended or should be read to prohibit any project owner,
351 client or professional from participating in any selection competition of their choosing, within the limits
352 and regulations of existing and applicable laws.
353

354 Although several procurement methods exist that can be used by clients both in the public and private
355 sectors, one that has long been endorsed by ASPRS and that has received widespread support in other
356 professions is qualifications based selection (QBS). QBS is an objective, fair and competitive process
357 used by owners to select professionals based on professional qualifications and capabilities in relation to
358 the work required; scope of work and cost of services are then negotiated to best meet project
359 requirements.
360

361 QBS is widely accepted for procurement of architecture, engineering and related professional services,
362 commonly referred to as A/E services. Federal law, as prescribed in 40 U.S.C. 1101, commonly referred
363 to as the Brooks Act, and state laws (mini-Brooks Acts) in most states, and the American Bar Association
364 Model Procurement Code for State and Local Government require QBS procurement methods for

365 architecture, engineering and related surveying and mapping services. There is no law mandating price
366 competition for such services.

367
368 The QBS process, as outlined by the Brooks Act and similar state laws, requires that an agency or private
369 party first select a professional services provider based solely on an evaluation of that proposer's
370 qualifications and capability to complete the work. Cost and price are not a factor in the initial ranking of
371 proposers. Under the QBS process, costs are negotiated with one proposer at a time, starting with the
372 most highly qualified proposer. If a fair and reasonable cost cannot be negotiated with the highest
373 ranked proposer, cost and price are then negotiated with the next most highly qualified proposer.

374
375 QBS is endorsed for procurement of professional services by many other professional organizations
376 including the American Institute of Architects (AIA), American Society of Civil Engineers (ASCE), National
377 Society of Professional Engineers (NSPE), American Public Works Association (APWA), American Council
378 of Engineering Companies (ACEC), Design Professionals Coalition, (DPC), American Water Works
379 Association (AWWA), American Bar Association (ABA), Management Association for Private
380 Photogrammetric Surveyors (MAPPS), American Congress on Surveying and Mapping (ACSM) now
381 known as the National Society of Professional Surveyors (NSPS), and Council on Federal Procurement of
382 Architectural and Engineering Services (COFPAES), as well as agencies such as the U.S. Army Corps of
383 Engineers. These organizations all endorse QBS as the best means of promoting competition for
384 professional services. Competition among professionals is healthy and desirable and ensures that
385 project dollars are well spent. QBS provides a level playing field that promotes fair and open
386 competition, guaranteeing that only skilled, experienced, and able professionals are selected before
387 price is negotiated and determined. As a result, clients acquire the services of the most qualified
388 proposer possible while obtaining a price that is fair and reasonable.

389
390 It is also significant that the American Bar Association Model Procurement Code for State and Local
391 Government endorses QBS for surveying and mapping services. When the Nation's leading attorneys in
392 government acquisition evaluated all available methods, they recommended QBS for geospatial
393 services. It is also noteworthy that Congress specifically defined QBS as a competitive procedure in the
394 landmark Competition in Contracting Act in 1983, and has retained that law ever since.

395
396 Many professional photogrammetric mapping and related remote sensing services are directly related
397 to architecture and engineering or are otherwise relied upon to determine the authoritative geospatial
398 location of features or topography. These applications of photogrammetric mapping and related remote
399 sensing technologies to determine location and topography similar in nature to the type of information
400 provided by field surveyors would be considered surveying by most definitions. In recent years, many
401 other professional level geospatial applications of photogrammetric and remote sensing mapping
402 technologies have developed that may not be directly related to architecture, engineering or the
403 authoritative location of features typically associated with professional surveying. Examples include
404 thematic mapping for land cover, photogrammetric mapping for GIS centerline coverages, disaster
405 recovery assessment, and similar work. Since many laws and regulations have not kept up with these
406 advancements in the marketplace, these *Guidelines* are intended to help clarify procurement processes
407 as they apply to current practice.

408
409 While some applications of current photogrammetric mapping technologies may not have a direct tie to
410 architecture or engineering, they share a very similar level of reliance on the professional practitioner to
411 employ sound judgment, professional expertise and professional ethics in order to develop contracted

412 mapping deliverables that can be relied upon to make decisions that impact life, health, safety, property
413 and/or the public welfare. While these tasks may not require the same level of accuracy required for
414 architecture, engineering and surveying applications, there remains an expectation of a level of quality
415 and standard of performance that requires a professional level service.

416
417 Regarding regulatory standard(s), States typically use the test of actual potential for harm to life, health,
418 safety, property and/or the public welfare to determine the minimum level of activities that should
419 require a license. However, from a procurement guidelines perspective, the bar should not be placed at
420 the minimum level. Rather, procurement guidelines should set the standard to achieve what is in the
421 best interest of the public, and what is most likely to ensure a successful project.

422
423 Procuring photogrammetric services is vastly different from procuring products, basic supplies or even
424 construction services. Often, the photogrammetric mapping professional is the only professional
425 involved in the process that fully understands the specifications, accuracies, methodologies and
426 approach that will support project objectives and the intended end use of the agreed to project
427 deliverables. As such, a photogrammetric mapping professional who is familiar with all aspects of the
428 project should play an instrumental role in determining the project specifications.

429
430 Determining what to include in a comprehensive request for proposal (RFP) for geospatial mapping
431 services is a complicated task. As a result, RFPs are often vague and missing key information. When an
432 RFP lacks sufficient detail, each proposer competing for the work will most likely interpret it differently.
433 Consequently, proposals vary widely in scope and detail, creating an “apples and oranges” disparity in
434 project details. When price is one of the key selection criteria, proposers often use the lowest-cost
435 approach, which often means discounting advanced technologies, the best techniques, and the most
436 effective overall project design. QBS improves the procurement process and, in so doing, improves
437 service to private entities, public agencies and end users/taxpayers and ultimately provides the best
438 value and most fair and reasonable cost to the client.

439
440 QBS, as outlined by the Brooks Act, is widely used for architecture, engineering and surveying services
441 procurement. Professional organizations and federal, and state lawmakers have long recognized that
442 these kinds of services critically affect life, health, safety, property and/or the public welfare. The QBS
443 procurement approach best protects the taxpayers’ and clients’ interest and at the same time best
444 safeguards public health and safety. The professional level photogrammetric mapping services outlined
445 in these *Guidelines* share many characteristics with, are of similar nature to, and are of similar
446 importance to life, health, safety, property and/or the public welfare as the engineering, architecture,
447 surveying, planning, natural resources, emergency/disaster recovery services and other services that
448 they support.

449
450 For these reasons, ASPRS endorses a QBS procurement method such as the Brooks Act or similar QBS
451 procurement procedure to guide the procurement of professional mapping services.

452

453 **Federal and State Regulations Affecting Procurement and Licensure**

454 ASPRS recognizes that the practice and procurement of many aspects of professional photogrammetric
455 services are regulated by federal, state and local laws. These *Guidelines* are not intended to be an
456 interpretation of local, state or federal law, nor are they intended to imply that all professional level
457 services defined herein require a licensed professional. These *Guidelines* outline those services which, in

458 the opinion of ASPRS, are professional in nature and therefore warrant consideration for procurement
459 methods that use qualifications, and not cost, as the initial and primary selection criteria.

460
461 Many states regulate and, by statute, require a license for some aspects of professional
462 photogrammetric services. Services outlined in this document may or may not be covered by licensure
463 statute for a given state.

464
465 State licensing laws must be considered in the procurement of professional geospatial mapping services.
466 For instance, many states require a license to practice specific aspects of photogrammetric mapping and
467 other geospatial mapping services. Definitions and regulations vary widely from state to state. State
468 statutes may refer specifically to photogrammetric mapping or may regulate mapping under broader
469 definitions of surveying or engineering. Contracting personnel who are more accustomed to the
470 procurement of other types of goods and services, even including more conventional engineering or
471 surveying work, are not always knowledgeable about state laws that apply to geospatial mapping
472 services. Contracting and procurement personnel should contact the state licensing board for surveying
473 and engineering in the state(s) in which the work is to be performed to confirm what aspects of existing
474 survey and engineering statutes apply to their projects. Procurement practices need to comply with
475 state licensing laws.

476
477 State legislatures periodically review and modify their licensing laws, and state licensing boards
478 periodically modify regulations in order to address developing technologies and evolving professional
479 practices. To support this process, the NCEES has developed a Model Law and associated Model Rules
480 that serve as a guide when modification of applicable statutes is deemed appropriate. The NCEES Model
481 Law and Model Rules consider the application and intent of the work, and not the tools used, as the
482 determining factor in distinguishing between mapping services that should be licensed and other
483 mapping services that do not require a license. The NCEES model identifies “surveying” services as any
484 work, regardless of the tool used, that determines or establishes an authoritative location or
485 measurement of features on or relative to the Earth, as represented by the resulting “survey,” map or
486 comparable GIS data layer deliverable. This includes many remote sensing and photogrammetric
487 services, such as controlled aerial photography, stereo feature extraction, orthophotography, lidar
488 surveys and similar tasks.

489
490 NCEES documents are considered by ASPRS to be the best definitive guideline for determining which
491 geospatial services should require a professional license. In the absence of specific statutory licensing
492 language or precedent for enforcement in a given jurisdiction, procurement personnel are encouraged
493 to use the NCEES Model Law and Model Rules as guidelines to evaluate which services may potentially
494 be regulated under state law. However, the NCEES Model Law and Model Rules are only guidelines for
495 the purpose of assisting state governments in the implementation and interpretation of state licensing
496 laws. The Model Law and Model Rules do not represent enacted legislation and do not have any specific
497 legal authority, unless so enacted in a given state.

498
499 The NCEES Model Law was developed to address licensing, not procurement. The term “professional
500 services” is broader than, and not synonymous with, “licensed” or “regulated” services. The
501 procurement recommendations outlined in these *Guidelines* are not limited to those “licensed” services
502 identified by state licensing laws or NCEES Model Law recommendations. These *Guidelines* recognize
503 that there are many geospatial mapping applications that require professional knowledge and skill that
504 are not directly tied to engineering, architecture or surveying, and that may not be regulated by

505 licensing laws. Qualifications based selection is recommended for all professional geospatial mapping
506 services and not just those services that require a professional license. It should also be specifically
507 recognized that licensed individuals are not necessarily more qualified to perform a specific professional
508 service than unlicensed individuals; qualifications evaluation criteria should be applied fairly and
509 appropriately to all qualified service providers.

510
511 Federal procurement laws are implemented in the Federal Acquisition Regulation (FAR). Surveying and
512 mapping services are included in the federal definition of architecture and engineering services that are
513 subject to FAR 36.6 and which require Brooks Act QBS procurement. It is the opinion of ASPRS, that FAR
514 36.6 would, at a minimum, apply to all federal procurement of photogrammetry and related remote
515 sensor-based services that are defined as surveying by individual states and, in the absence of such
516 definition, by the NCEES Model Law and Model Rules. In some circumstances, FAR 36.6 may apply to a
517 broader range of services, depending on the definition of surveying and specific licensing requirements
518 applicable in the state or states in which the work is to be performed.

519
520 Many states and local jurisdictions have enacted laws and rules, based on the federal Brooks Act, which
521 require the use of QBS for procurement of A/E services for local jurisdictions and state agencies. Other
522 federal laws may also require state and local agencies to use QBS when expending federal grant funds
523 for A/E, including surveying and mapping, services. A reference summarizing some of these federal grant
524 fund requirements is provided in the references section. Furthermore, many state registration boards
525 require their licensees (architects, engineers and surveyors) to adhere to the rules of QBS when
526 responding to procurement announcements issued by agencies covered by the public law or state/local
527 equivalents. In states where such laws and rules apply, licensees who do not obey those rules when
528 responding to procurement announcements can be individually disciplined by their licensing board.

529
530 The recommended decision process for determining the procurement approach that is the most
531 appropriate for a specific procurement scenario is outlined in Appendix 3, Professional Geospatial
532 Services Procurement Decision Model.

533

534 **Guidelines for Other Methods of Procuring Services**

535 ASPRS recognizes that the QBS process is not required by law in all cases, particularly for services
536 acquired by organizations not subject to federal or state procurement laws, or in cases for which the
537 requested services may not be intended to determine authoritative locations, and therefore may not
538 meet the NCEES or State Law definitions of surveying services that are often subject to A/E and QBS
539 procurement laws.

540
541 ASPRS has long recommended that the Brooks Act or similar qualifications based selection methods be
542 used for procurement of professional photogrammetry and related remote sensor-based geospatial
543 mapping services. However, ASPRS recognizes there will be instances when an organization will choose
544 to use a procurement method wherein initial price submittals influence which proposer is selected for
545 negotiations.

546
547 In those cases, ASPRS emphasizes the importance of implementing procurement criteria that ensure
548 that qualifications, not cost, is the primary selection factor. ASPRS recommends the following guidelines
549 be applied to any procurement method that does not adhere to the process outlined by the Brooks Act
550 or a similar QBS statute or process:

- 551 • Qualifications should always be the primary selection factor.
- 552 • Qualifications rankings should not be influenced by cost.
- 553 • The scope of work must be well defined and developed by a professional who has extensive
- 554 knowledge of the work to be performed and is qualified to ensure that the scope of work will
- 555 best serve the client's interests.
- 556 • Projects that have a significant element of design, and wherein the service provider's
- 557 professional judgment is relied upon to develop the scope of work, methodology or approach,
- 558 should always use QBS and should not include cost as an initial selection criterion.
- 559 • A registered, certified or otherwise qualified professional with specific knowledge or expertise
- 560 with the services being procured (either on the client's staff or hired as a consultant) should
- 561 have a significant role in the review of both the technical proposal and any cost proposals in
- 562 order to ensure that the work best meets the end user and public interests.
- 563 • If project cost information are to be considered in the selection process, they should be
- 564 submitted separately and considered only after proposers are ranked based on qualifications.
- 565

566 **Subcontracted Services**

567 It is recognized that professional geospatial mapping services may be procured within the scope of a
568 more extensive project, wherein the specific professional geospatial mapping services would be
569 considered "incidental" to the project. In cases where the total dollar value of the geospatial mapping
570 component of the project is small, it is understood that other procurement processes may reasonably
571 apply.

572
573 However, regardless of the method of procurement for the larger project, or the size of the geospatial
574 mapping component of the project, ASPRS recommends that these *Guidelines* be applied to all
575 professional geospatial mapping subcontracts.

576

577 **VI. Summary: Procurement of PGMS**

578 This section outlines definitions related to, and examples of, Professional Geospatial Mapping Services
579 (PGMS). Federal, State and Local Government agencies, researchers, private entities and other
580 organizations can use this information to help determine the best approach and methodology for
581 procuring PGMS. The intent of the information in this section is to characterize PGMS deliverables and
582 criteria to consider when evaluating the procurement of geospatial services. The procurement of
583 geospatial products, hardware, software, technical services, or product support services have not been
584 addressed in this section with the exception of their mention in order to distinguish them from the items
585 covered herein.

586 Chapter 2 587 Procurement of Commercial Geospatial Mapping 588 Products (CGMP)

589 I. Definition of CGMP

590 For the purpose of these *Guidelines*, CGMP refers to products created through the use of “non-
591 professional” geospatial mapping services and map data that are readily available from commercial
592 providers. Data and products described as “commercially available off-the-shelf” or COTS are typically
593 created by a provider at its own expense (referred to as a “Vendor” in the Federal Acquisition
594 Regulations) and are not subject to modification by the provider for the procuring agency / customer.
595 Product support such as installation, data reformatting, training, maintenance, and periodic updates of
596 the licensed data may be included in the procurement of CGMP provided that such support is limited to
597 fulfilling the warranty and/or specification as defined in the user license, and does not involve the
598 alteration of the original licensed CGMP for a specific end user application.

599 II. Characteristics of CGMP

600 ASPRS considers that CGMP must demonstrate a majority of the following attributes:

- 601 • Represent a level of standardization as defined by the provider
- 602 • Have the ability to meet a published specification or a stated industry standard
- 603 • Provide an end-user warranty
- 604 • Provide the end-user with a non-exclusive license or other form of shared ownership
- 605 • Pricing has been established through a published catalog
- 606 • License includes clearly defined terms and conditions including authorized and unauthorized
607 uses
- 608 • The provider defines the geospatial product specifications and as such, the final product is not
609 subject to change by the provider for a specific agency / customer end use.

610 III. CGMP Addressed by these Guidelines

611 These *Guidelines* are specifically intended to apply to the COTS CGMP that have been produced from
612 remotely-sensed imagery and/or other sources and types of geospatial data. The primary focus of this
613 document is on the photogrammetry, remote sensing and image-based CGMP that constitute an area of
614 expertise of ASPRS and its membership. Processes for the procurement of COTS are documented by the
615 Department of Defense and the Federal Acquisition Regulations (FAR).

616 “Commercial Off-the-Shelf (COTS),” as defined by the Department of Defense (“Commercial Item
617 Acquisition: Considerations and Lessons Learned,” June 26, 2000, pg. 3)
618 www.acq.osd.mil/dpap/Docs/cotsreport.pdf, is as follows:

619 “A commercial off–the–shelf (COTS) item is one that is sold, leased, or licensed to the general public;
620 offered by a Vendor trying to profit from it; supported and evolved by the Vendor who retains the
621 intellectual property rights; available in multiple, identical copies used without modification of the
622 internals.”

623 FAR section 2.101 defines Commercially available off-the-shelf (COTS) item as “(1) Any item of supply
624 (including construction material) that is – (i) A commercial item as defined in paragraph (1) of the
625 definition in this section); [any item, other than real property that is of a type customarily used by the
626 general public or by non-governmental entities for purposes other than governmental purposes, and has
627 been sold, leased, or licensed to the general public or has been offered for sale, lease, or license to the
628 general public]; (ii) Sold in substantial quantities in the commercial marketplace; and (iii) Offered to the
629 Government, under a contract or subcontract at any tier, without modification, in the same form in
630 which it is sold in the commercial marketplace; and (2) Does not include bulk cargo.”

631
632 A “commercial item” as defined in the Federal Acquisition Regulation (FAR), Part 2.101, has the
633 following general characteristics:

- 634 • It has been sold, leased, or licensed to the general public.
- 635 • It is generally available in the commercial marketplace.
- 636 • It may include installation, maintenance, repair, training and other services supporting the
637 commercial item.
- 638 • It is sold based on published catalog or list prices available to the general public.

639 For additional FAR text from Section 2.101 see Appendix 2 to these *Guidelines*.

640 **IV. Examples of CGMP**

641 This section provides examples of some types of CGMP that are currently available in the marketplace.
642 CGMP are COTS products available to a specification defined by the provider (vendor) typically
643 developed to meet the need in the market place. CGMP include, but are not limited to:

- 644 • **3-D Models** – A three dimensional representation of a real object made from remotely sensed
645 technology for applications such as community planning and development, disaster
646 preparedness, facility management tactical planning, virtual visits, and more.
- 647
648 • **RGB and Infrared (IR) Images** – Imagery collected using remote sensing technology in the visible
649 light spectrum (red-green-blue) or infrared, used to recognize environmental trends in the area,
650 such as vegetation mapping, commercial development planning and landscape management,
651 watershed management, forestry management, and environmental impact assessment.
- 652
653 • **Nadir/Vertical Photographs** – Images in which the image center is vertically beneath the camera
654 center at the time of exposure. Vertical photographs are usually taken with the optical axis of the
655 camera kept within 5° of the vertical.
- 656
657 • **Ortho** – Images geometrically corrected for topographic relief, lens distortion, and camera tilt, to
658 ensure a uniform scale.
- 659
660 • **Oblique images** – An aerial photograph taken with the optical axis of the camera deliberately
661 pointed away from the vertical. Oblique photographs could therefore be defined as photographs

662 usually taken with the optical axis more than 5° from the vertical. Enables at-an-angle view of
663 properties, etc.; from different directions.

- 664
- 665 • **Ground Control** – Previously georeferenced feature(s) which include metadata that references
666 the accuracy, collection procedures, methodologies, and/or source data.
667
 - 668 • **Vector Road and Street Data** – Standard off-the-shelf data sets with geospatially accurate road
669 and street data with addressing. Typically these data products include Points of Interest (POI)
670 such as hotels, fuel stations, schools, and airports. A vector represents a physical quantity or
671 feature having both length and direction.
672
 - 673 • **Parcel Data** – Parcel data includes attributes such as property description, zoning, ownership,
674 and appraised or market value. These data sets are typically available by city, county or state. A
675 parcel is a single piece of land described in a single description in a deed or as one of a number
676 of lots on a plat, separately owned either publicly or privately and capable of being conveyed
677 separately.
678
 - 679 • **Land Use Data** – Commercially or government furnished data sets of land use are provided for
680 planning activities. Products are available for local and regional assessment.
681
 - 682 • **Digital Elevation Model (DEM)** – a digital model or 3-D representation of a terrain’s surface.
683
 - 684 ○ **Digital terrain model (DTM)** – a bare-earth model in which cultural features such as
685 buildings, roads, and vegetation canopy are digitally removed using processing software.
 - 686 ○ **Digital surface model (DSM)** – a first-reflective-surface model that contains cultural
687 features such as buildings, roads, vegetation, and natural terrain features.
688
 - 689 • **Orthorectified radar image (ORI)** – a grayscale image of the earth’s surface roughness that has
690 been corrected to remove geometric distortions.
691
 - 692 • **Elevation shaded image (ESI)** – a multi-spectral image composed of a DEM overlaid with high-
693 resolution aerial images to provide an enhanced visual representation of the terrain that cannot
694 be duplicated with ordinary images. As the name suggests, a shaded relief product draws out
695 terrain features and is more intuitive than either the DSM or DTM on which it is based.
696
 - 697 • **Hosted / Online Data** – Defined as Data as a Service (DaaS), this refers to the data product that
698 can be provided under a subscription model and may be provided under a Software as a Service
699 (SaaS) application.
700

701 There are several methods for the delivery of CGMP. These include but are not limited to a shrink
702 wrapped package, download from a web service or online store, shipped via electronic media or via “the
703 cloud.” The delivery method will be defined by the provider and driven by market demand. “Metadata”
704 is an additional feature of many of the products noted.
705

706 **NOTE:** Specific contracts may require an appropriately licensed professional to meet requirements for
707 State Laws or project scope of work. The professional should be responsible for the research of data
708 available, fit for use of data, and integration of the products described above.

709 **Product Support**

710 In order to fulfill warranties as defined within the user license, CGMP providers may offer customer
711 product support. Product support can also be offered to the public under similar terms and conditions
712 or sold competitively in substantial quantities based on established catalog or market prices. For the
713 purpose of these *Guidelines* product support is limited to:

- 714
- 715 • **Installation** – The act of installing the required CGMP into a customer test and/or production
716 environment. Customer service and help desk are also covered.
717
- 718 • **Data Reformatting** – The process of changing the delivery format so that it may be optimally
719 used in the customers’ system(s). May also include changing file formats of data delivery and
720 orders of occurrence of data to match customer needs for automated use of CGMP.
- 721 • **Maintenance** – That which may be required to fulfill the product warranty as defined within the
722 user license.
723
- 724 • **Training** - The transfer of knowledge, skills, and competencies that relate to the use of the
725 CGMP.
726

727 **V. Procurement of CGMP**

728 The following are considered best practices for the procurement of CGMP.

- 729 • **Pre-proposal research, including requirements definition**
 - 730 ○ Organizations should carefully evaluate their project requirements; the appropriateness
731 of CGMP in a “fit for use” context, and should document the research results so that
732 required CGMP can be clearly defined.
733
 - 734 ○ The requirements definition should include, at a minimum:
 - 735 ■ Consideration of technical requirements,
 - 736 ■ Schedule and method of delivery,
 - 737 ■ Acceptable warranty and/or licensing restrictions,
 - 738 ■ Documentation expected to be provided by the CGMP provider, including
739 specifications, instruction manuals and metadata
 - 740 ■ Geographic area to be covered by the CGMP.
 - 741 ■ Availability of support / maintenance
742
- 743 • **Market Analysis**
 - 744 ○ Market analysis may be conducted to determine the availability of CGMP that may meet
745 the defined project requirements. Such an analysis should seek to clarify the likely price
746 ranges for these CGMP.
747

- 748 ○ Market analysis source information may include information based on:
749 ▪ Personal knowledge of the market and available CGMP,
750 ▪ Historical purchase information,
751 ▪ Company web sites or online catalogs,
752 ▪ Qualified provider lists compiled through such a market analysis,
753 ▪ Commercial catalogs, trade journals, newspapers, and other professional
754 publications,
755 ▪ Verification of user references
756
- 757 • **Development of Source Solicitation Package**
758 ○ Depending on the regulations of the procuring organization and factors like the size of
759 the procurement, a solicitation package may be required. The specific documents in the
760 source solicitation package may include:
761 ▪ Specifications documents - These documents describe in detail the CGMP
762 required.
763 ▪ Products support required to integrate the CGMP into the customers' chosen
764 application.
765 ▪ Evaluation methodology - A description of how any proposals for CGMP will be
766 evaluated, including final award criteria and weighting.
767 ▪ Due dates, points of contact, required supporting documentation/information,
768 and any special instructions.
769
- 770 • **Issuing the Source Solicitation Package**
771 ○ Issuing the source solicitation package involves providing the source solicitation directly
772 to providers or placing it in an advertised location or on a web site where source
773 solicitation packages reside (for instance, <http://www.fedbizopps.gov>).
774
- 775 • **Evaluating Proposals (Selection Decision and Award)**
776 ○ The customer should evaluate CGMP based on criteria defined and published prior to
777 receipt of proposals. The organization may communicate with individual providers, as
778 appropriate, to address the responder's understanding of the requirements,
779 performance capabilities, price range limitations, and other terms and conditions.
780 ▪ **Selection Decision and Award-** the provider should be selected based on the
781 best value to the procuring organization, taking into account factors including,
782 but not limited to: provider experience/capability, price, quality of deliverables,
783 delivery schedule and method, warranty or licensing, and payment terms.
784 ▪ **Documentation** The method of selection and rationale for awarding the contract
785 should be documented and maintained by the procuring organization.
786

787 **Acquisition of CGMP**

788 Part 12 of the FAR establishes Federal procedures for acquisition of commercial items. Policy background
789 in Part 12 states that the government should acquire commercial items whenever possible when they
790 are available to meet the needs of the agency. The procedures defined in Part 12 are generally used in

791 conjunction with Part 13 (Simplified Acquisition), Part 14 (Sealed Bidding), or Part 15 (Contracting by
792 Negotiation), whichever is applicable.

793 General steps to be followed in acquiring a commercial item, as defined in FAR Part 12, are as follows:

794 “(a) Conduct market research to determine whether commercial items or non developmental
795 items are available that could meet the agency’s requirements;

796 (b) Acquire commercial items or non developmental items when they are available to meet the
797 needs of the agency; and

798 (c) Require prime contractors and subcontractors at all tiers to incorporate, to the maximum
799 extent practicable, commercial items or non developmental items as components of items
800 supplied to the agency. “

801 Of particular note, FAR Part 12 includes the following statement,

802 “... the Government shall acquire only the technical data and the rights in that data customarily
803 provided to the public with a commercial item or process. The contracting officer shall presume
804 that data delivered under a contract for commercial items was developed exclusively at private
805 expense.”

806 Specific language from FAR Part 12 is included in Appendix 4 of these *Guidelines*.

807 Determining what to include in a comprehensive request for proposal (RFP) for CGMP may be a
808 complicated task. As a result, RFPs are often vague, omit key information or have different specifications
809 that are open to widely varying interpretations by the potential providers. It is for this reason that ASPRS
810 highly recommends that a licensed or certified professional be involved in the development of the RFP,
811 proposal review, and procurement decision(s).

812 CGMP may be procured through a “best value” based solicitation. It is critical in best value based
813 solicitations that the specifications of the product are well documented by the provider (i.e., “truth in
814 labeling”), understood by the customer, and that all intended uses and acquisition costs are carefully
815 evaluated. Involving a licensed or certified professional early in the procurement process will ensure
816 that the CGMP to be acquired are appropriate for the proposed application.

817 **U.S. General Services Administration (GSA) Procurement Vehicle**

818 The GSA provides a purchasing vehicle, the Federal Supply Schedule, for the procurement of CGMP from
819 providers registered under the program. These CGMP may include COTS software, data, and product
820 support as defined within the schedule. These CGMP can be procured under standard, agreed and
821 structured Terms and Conditions provided under GSA. In addition, the GSA procurement vehicle provides
822 a pre-approved rate structure between GSA and the provider, to ensure a consistent CGMP price to the
823 federal user agency or authorized federal contractor.

824 Caution must be exercised in the acquisition of contracted professional geospatial services as such
825 professional services are prohibited by law from being offered or sold through GSA schedule contracts.

826 The GSA may be used for products such COTS CGMP and product support items only.

827 **Contractors Authorized to Use GSA**

828 Federal employees, agencies, or authorized federal contractors have access to the GSA procurement
829 vehicle for federal projects. ASPRS recommends that contracting officers refer to FAR 51.101 regarding
830 the authorization for contractors to use Federal Supply Schedule contracts in the performance of
831 government cost-reimbursement contracts.

832

833 **VI. Summary: Procurement of CGMP**

834 This section outlines definitions related to, and examples of, Commercial Geospatial Mapping Products
835 (CGMP). Federal, state and local government agencies, researchers, private entities and other
836 organizations can use this information to help determine the best approach and methodology for
837 procuring CGMP. The intent of the information in this section is to characterize CGMP deliverables and
838 criteria to consider when evaluating the procurement of geospatial products. Not addressed in this
839 section are procurement of geospatial professional services, hardware, software, or technical services
840 with the exception of their mention in order to distinguish them from the items covered herein.

841

842 **Appendix 1:**
 843 **Comparison of Professional Services, Products and**
 844 **Product Support**

845 Comparison of Services, Products and Product Support Services (Adapted from MAPPS Products vs.
 846 Service Matrix, www.mapps.org)
 847

OFFERING CHARACTERISTICS	PROFESSIONAL SERVICE	PRODUCT	PRODUCT SUPPORT
Level of Standardization	Dynamic In consultation with the Client, Provider exercises professional judgment in developing the appropriate level of standards needed to meet the Clients' project specific requirements and expectations.	Static Product standards are solely determined and defined by the Provider and are not subject to change by the Customer.	Static Product support standards are solely determined by the Provider and documented in a license agreement.
Specifications	Established by Client with critical input from a professional service Provider. Specifications are clearly defined in contract documents.	Established solely by Provider and are not subject to change by the Customer. Specifications may not be clearly defined.	Established solely by Provider.
Ownership	Client owns the contracted project deliverables while Provider may retain ownership of resulting work documents such as notes, computations, and records related to the development of the contracted project deliverables.	Provider retains ownership of the data that is offered under a non-exclusive license to individuals, private organizations, and government agency Customers.	Product support may be offered by the Provider to fulfill Product warranties and are defined in licensing agreements. Non-computational data reformatting requested by a Customer, may or may not be owned by Customer.
Certification/Warranty	Must meet clearly defined contractual accuracy requirements and sealed by a licensed or certified professional.	Provider is not required certify that the Product will meet the Customer's needs. Customer is solely responsible for quality control and for verifying that the product will meet the Customer's specifications and expectations. Product warranties are documented in the Providers' license.	
Protection of Public Welfare	Professional liability applies. Licensed professionals have meet the qualifications criteria as defined by professional licensing boards who's primary mission is to protect the public's health, safety, and well fare by only licensing qualified individuals.	Product liability applies. Provider is responsible for ensuring product(s) meet Provider's documented specifications. Customer is responsible for identifying and evaluating the risk to the publics' health, safety and welfare that may result directly or indirectly from the use of commercially available products.	

<p>Procurement Method</p>	<p>Qualification-Based Selection Competitive procurement process established by the US Congress as part of the Brooks Act. Procuring entity evaluates submitted qualifications and selects most highly qualified firm. Scope of work, schedule, budget, and fee are negotiated.</p>	<p>Best Value Price and other key factors can be considered in the evaluation and selection process.</p>	<p>Best Value Price and other key factors can be considered in the evaluation and selection process.</p>
<p>Price</p>	<p>Negotiated between Provider and client based on the level of effort required to prepare the deliverables to be provided using pre-approved rates. May be contracted as fixed price or as cost plus fixed fee.</p>	<p>Published unit pricing. Total price is determined by multiplying the number of units to be purchased by the catalog price per unit.</p>	<p>Based on published catalog or market prices.</p>

848

849

850 **Appendix 2:**
851 **Excerpts from FAR 2.101**

852 https://acquisition.gov/far/html/Subpart%202_1.html#wp1145508

853 “Commercial item” means—

854 (1) Any item, other than real property, that is of a type customarily used by the general public or by non-
855 governmental entities for purposes other than governmental purposes, and—

856 (i) Has been sold, leased, or licensed to the general public; or

857 (ii) Has been offered for sale, lease, or license to the general public;

858 (2) Any item that evolved from an item described in paragraph (1) of this definition through advances in
859 technology or performance and that is not yet available in the commercial marketplace, but will be
860 available in the commercial marketplace in time to satisfy the delivery requirements under a
861 Government solicitation;

862 (3) Any item that would satisfy a criterion expressed in paragraphs (1) or (2) of this definition, but for—

863 (i) Modifications of a type customarily available in the commercial marketplace; or

864 (ii) Minor modifications of a type not customarily available in the commercial marketplace made
865 to meet Federal Government requirements. Minor modifications mean modifications that do not
866 significantly alter the nongovernmental function or essential physical characteristics of an item
867 or component, or change the purpose of a process. Factors to be considered in determining
868 whether a modification is minor include the value and size of the modification and the
869 comparative value and size of the final product. Dollar values and percentages may be used as
870 guideposts, but are not conclusive evidence that a modification is minor;

871 (4) Any combination of items meeting the requirements of paragraphs (1), (2), (3), or (5) of this definition
872 that are of a type customarily combined and sold in combination to the general public;

873 (5) Installation services, maintenance services, repair services, training services, and other services if—

874 (i) Such services are procured for support of an item referred to in paragraph (1), (2), (3), or (4) of
875 this definition, regardless of whether such services are provided by the same source or at the
876 same time as the item; and

877 (ii) The source of such services provides similar services contemporaneously to the general
878 public under terms and conditions similar to those offered to the Federal Government;

879 (6) Services of a type offered and sold competitively in substantial quantities in the commercial
880 marketplace based on established catalog or market prices for specific tasks performed or specific

881 outcomes to be achieved and under standard commercial terms and conditions. For purposes of these
882 services—

883 (i) “Catalog price” means a price included in a catalog, price list, schedule, or other form that is
884 regularly maintained by the manufacturer or vendor, is either published or otherwise available
885 for inspection by customers, and states prices at which sales are currently, or were last, made to
886 a significant number of buyers constituting the general public; and

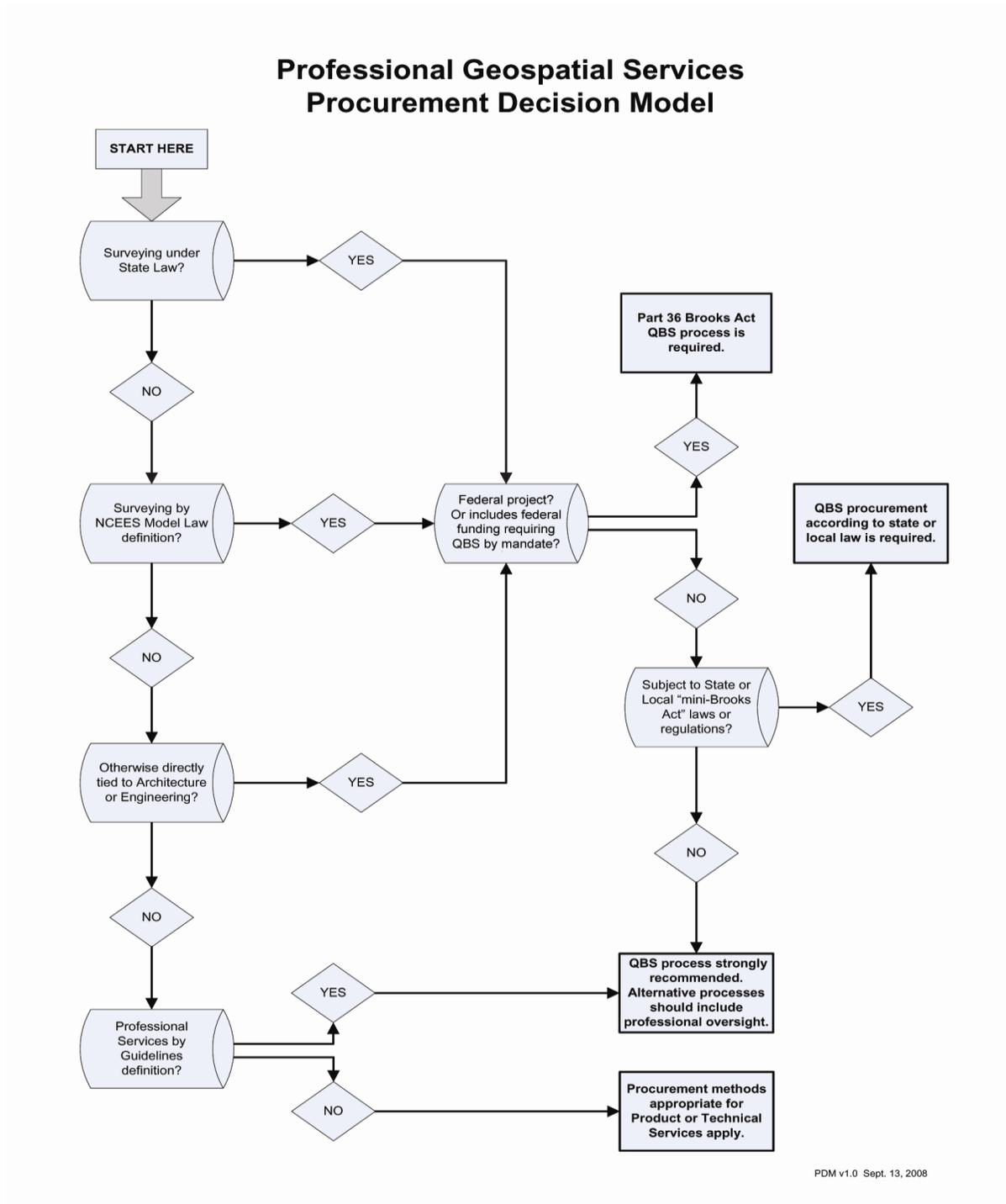
887 (ii) “Market prices” means current prices that are established in the course of ordinary trade
888 between buyers and sellers free to bargain and that can be substantiated through competition or
889 from sources independent of the offerers.

890 (7) Any item, combination of items, or service referred to in paragraphs (1) through (6) of this definition,
891 notwithstanding the fact that the item, combination of items, or service is transferred between or
892 among separate divisions, subsidiaries, or affiliates of a contractor; or

893 (8) A non developmental item, if the procuring agency determines the item was developed exclusively at
894 private expense and sold in substantial quantities, on a competitive basis, to multiple State and local
895 governments.

896

897 **Appendix 3:**
898 **Professional Geospatial Services Procurement**
899 **Decision Model**



900 **Appendix 4:**
901 **Excerpts from FAR Part 12: Acquisition of**
902 **Commercial Items**

903 <https://acquisition.gov/far/html/FARTOCP12.html#wp1033864>

904 **12.000 Scope of part.**

905 This part prescribes policies and procedures unique to the acquisition of commercial items. It
906 implements the Federal Government’s preference for the acquisition of commercial items contained in
907 Title VIII of the Federal Acquisition Streamlining Act of 1994 (Public Law 103-355) by establishing
908 acquisition policies more closely resembling those of the commercial marketplace and encouraging the
909 acquisition of commercial items and components.

910 **12.001 Definition.**

911 “Subcontract,” as used in this part, includes, but is not limited to, a transfer of commercial items
912 between divisions, subsidiaries, or affiliates of a contractor or subcontractor.

913 **Subpart 12.1—Acquisition of Commercial Items—General**

914 **12.101 Policy.**

915 Agencies shall—

916 (a) Conduct market research to determine whether commercial items or non developmental items are
917 available that could meet the agency’s requirements;

918 (b) Acquire commercial items or non developmental items when they are available to meet the needs of
919 the agency; and

920 Require prime contractors and subcontractors at all tiers to incorporate, to the maximum extent
921 practicable, commercial items or non developmental items as components of items supplied to the
922 agency.

923 **12.102 Applicability.**

924 (a) This part shall be used for the acquisition of supplies or services that meet the definition of
925 commercial items at 2.101.

926 (b) Contracting officers shall use the policies in this part in conjunction with the policies and procedures
927 for solicitation, evaluation and award prescribed in Part 13, Simplified Acquisition Procedures; Part 14,
928 Sealed Bidding; or Part 15, Contracting by Negotiation, as appropriate for the particular acquisition.

929 (c) Contracts for the acquisition of commercial items are subject to the policies in other parts of this
930 chapter. When a policy in another part of this chapter is inconsistent with a policy in this part, this
931 Part 12 shall take precedence for the acquisition of commercial items.

932 (d) The definition of commercial item in section 2.101 uses the phrase “purposes other than
933 governmental purposes.” These purposes are those that are not unique to a government.

934 (e) This part shall not apply to the acquisition of commercial items—

935 (1) At or below the micro-purchase threshold;

936 (2) Using the Standard Form 44 (see 13.306);

937 (3) Using the imprest fund (see 13.305);

938 (4) Using the Government wide commercial purchase card; or

939 (5) Directly from another Federal agency.

940 (f)(1) Contracting officers may treat any acquisition of supplies or services that, as determined by the
941 head of the agency, are to be used to facilitate defense against or recovery from nuclear, biological,
942 chemical, or radiological attack, as an acquisition of commercial items.

943 (2) A contract in an amount greater than \$16 million that is awarded on a sole source basis for an item
944 or service treated as a commercial item under paragraph (f)(1) of this section but does not meet the
945 definition of a commercial item as defined at FAR 2.101 shall not be exempt from—

946 (i) Cost accounting standards (see Subpart 30.2); or

947 (ii) Cost or pricing data requirements (see 15.403).

948 (g)(1) In accordance with section 1431 of the National Defense Authorization Act for Fiscal Year 2004
949 (Public Law 108-136) (41 U.S.C. 437), the contracting officer also may use Part 12 for any acquisition for
950 services that does not meet the definition of commercial item in FAR 2.101, if the contract or task
951 order—

952 (i) Is entered into on or before November 24, 2013;

953 (ii) Has a value of \$27 million or less;

954 (iii) Meets the definition of performance-based acquisition at FAR 2.101;

955 (iv) Uses a quality assurance surveillance plan;

956 (v) Includes performance incentives where appropriate;

957 (vi) Specifies a firm-fixed price for specific tasks to be performed or outcomes to be achieved;
958 and

959 (vii) Is awarded to an entity that provides similar services to the general public under terms and
960 conditions similar to those in the contract or task order.

961 (2) In exercising the authority specified in paragraph (g)(1) of this section, the contracting officer may
962 tailor paragraph (a) of the clause at FAR 52.212-4 as may be necessary to ensure the contract’s remedies
963 adequately protect the Government’s interests.

964 **12.103 Commercially available off-the-shelf (COTS) items.**

965 COTS items are defined in 2.101. Unless indicated otherwise, all of the policies that apply to commercial
966 items also apply to COTS. Section 12.505 lists the laws that are not applicable to COTS (in addition to
967 12.503 and 12.504); the components test of the Buy American Act, and the two recovered materials
968 certifications in Subpart 23.4, do not apply to COTS.

969

970 Also:

971 **12.211 Technical data.**

972 Except as provided by agency-specific statutes, the Government shall acquire only the technical data
973 and the rights in that data customarily provided to the public with a commercial item or process. The
974 contracting officer shall presume that data delivered under a contract for commercial items was
975 developed exclusively at private expense. When a contract for commercial items requires the delivery of
976 technical data, the contracting officer shall include appropriate provisions and clauses delineating the
977 rights in the technical data in addenda to the solicitation and contract (see Part 27 or agency FAR
978 supplements).

979

980 Appendix 5: 981 Glossary of Terms

982 Glossary of Terms

983 This glossary represents a summary of definitions of selected key terms and phrases that are used
984 throughout the *Guidelines* document. Many of these terms are defined in greater detail within the full
985 text of the document. This glossary is intended to clarify potentially confusing terms in the context of
986 procurement of professional photogrammetry and related remote sensing products. This glossary is not
987 intended to be a comprehensive list of definitions of geospatial mapping terms and phrases.

988 • **Accuracy:** The degree of conformity of a measured or calculated value compared to the actual
989 value. Accuracy relates to the quality of a result and is distinguished from precision, which relates to
990 the quality of the operation by which the result is obtained

991 • **Authoritative:** Meeting clearly defined standards such as geospatial deliverables that have
992 been sealed by a licensed or certified professional.

993 • **Authoritative Location:** An authoritative location is a location that can be relied on as the basis
994 for making other determinations. Mapping data represented to meet a specific accuracy
995 requirement is considered to represent authoritative locations. Establishing or determining the
996 authoritative locations of features and boundaries is considered the practice of surveying. Refer to
997 NCEES materials cited in the references section and specific state regulation pertaining to
998 professional services for further clarification and examples of how this term applies to surveying and
999 mapping.

1000 • **Best Value:** The most advantageous balance of price, quality, and performance achieved through
1001 competitive procurement methods in accordance with stated selection criteria. (source:
1002 http://architecture.mt.gov/content/designconstruction/docs/Best_Value_Definition.pdf).

1003 • **Certification: Professional certification, trade certification, or professional designation,** often
1004 called simply *certification* or *qualification*, is a designation earned by a person to assure qualification
1005 to perform a job or task. Many certifications are used as post-nominal letters indicating an earned
1006 privilege from a legislative body acting to safeguard the public interest.

1007 • **Client:** Individuals or organizations engaged in a qualitative relationship with a professional
1008 service(s) provider whose professional skills and judgment are applied to their specific
1009 practice area in order to provide both tangible and intangible deliverables and/or services.

1010 • **Compiled:** To make or compose from other materials or sources.

1011 • **Customer** Individuals or organizations who are the recipient(s) of commercially available
1012 products.

- 1013 • **Deliverable(s):** Geospatial data, reports, and/or information/documents that are developed
1014 according to a defined set of specifications and delivered under the terms of a contractual
1015 agreement or task order.

- 1016 • **Direct Georeferencing:** The direct measurement of exterior orientation parameters, i.e. position
1017 (x/y/z coordinates) and attitude (roll/pitch/heading) at the instant an aerial photograph is taken, to
1018 aid or replace aerial triangulation. The term is also applicable to the position and orientation of
1019 airborne LiDAR or IFSAR sensors.

- 1020 • **Geomatics:** Includes the tools and techniques used in the disciplines of land surveying, remote
1021 sensing cartography, geographic information systems (GIS), global navigation satellite systems
1022 (GPS, GLONASS, Galileo, Compass), photogrammetry, geography and related forms of earth mapping.

- 1023 • **Georeference:** To associate data and information with a location in physical space; one example
1024 is, determining and establishing the mathematical relationship of vector features, raster images and
1025 other geographical features to map projections or coordinate systems.

- 1026 • **Geospatial mapping:** Mapping, information and data that identify the geographic location
1027 and characteristics of natural or constructed features or boundaries on the earth.

- 1028 • **Geospatial accuracy:** Accuracy of geospatial mapping data and information. Map accuracies
1029 include both positional accuracies and thematic accuracies:
 - 1030 ○ **Positional accuracy:** Accuracy of the horizontal and/or vertical coordinates that define the
1031 location of features represented by geospatial maps, data or information.
 - 1032 ○ **Thematic accuracy:** Accuracy of the feature characteristics or attributes represented by the
1033 geospatial maps, data or information.

- 1034 • **Licensure:** refers to the granting of a license, which gives a "permission to practice." Such licenses
1035 are usually issued in order to regulate some activity that is deemed to be dangerous or a threat to
1036 the person or the public or which involves a high level of specialized skill.

- 1037 • **Photogrammetry:** The art, science, and technology of obtaining reliable information about
1038 physical objects and the environment, through processes of recording, measuring, and interpreting
1039 images and patterns of electromagnetic radiant energy and other phenomena.

- 1040 • **Photogrammetry and related remote sensing:** This term is used throughout the document to clarify
1041 that the ASPRS definition of photogrammetry is not limited to conventional photographic imagery,
1042 but also includes imagery and measurements acquired using LiDAR, RADAR, multi-spectral imagery
1043 and other remote sensors.

- 1044 • **Orthophotograph:** A photograph prepared from a perspective photograph by removing those
1045 displacements of points caused by tilt, topographic relief and central projection (perspective).

1046 Sometimes called an orthophoto map, an orthophoto is georeferenced and is geometrically
1047 corrected such that the scale is uniform: the photo has the same lack of distortion as a map and can
1048 be used to measure distances, locations, angles, and the relationships between objects on the earth,
1049 to within a specified accuracy. Accuracy depends on process and project design parameters.

1050 • **Ownership:** Is the state or fact of exclusive rights and control over property, which may be an object,
1051 land/real estate or intellectual property.

1052 • **Product Sales:** Sale of standardized products, usually according to an established pricing structure
1053 and often offered under license agreements for specific uses; specifications are established by the
1054 provider, though the purchaser may be able to choose from several options. Refer to Table 1 for a
1055 detailed definition of products.

1056 • **Professional Services:** Projects that require specialized knowledge and skill, require independent
1057 judgment, and require a level of professional expertise and ethical conduct to ensure that the work
1058 meets the best interests of the client and public. Refer to Table 1 for a detailed definition of
1059 professional services.

1060 • **Product Support:** Provider services such as installation, configuration, data maintenance, data
1061 reformatting and training to support a product. Also include delivery services such as
1062 Provider Hosted, Software as a Service (SaaS) or Data as a Service (DaaS). Service Level
1063 Agreements, fee for service or annual maintenance fees typically apply

1064 • **Published Price List:** the providers' publicly published retail sales price for a product offered
1065 to the market. Retailers, wholesalers, or resellers may discount from this list at their
1066 discretion.

1067 • **Qualifications Based Selection:** Qualifications Based Selection (QBS) is an objective and competitive
1068 process used by a procuring entity (owner) who evaluates and selects the most qualified firm to
1069 procure services based on a professionals' qualifications in relation to the work required, found in
1070 Federal law (40 USC 1101), the American Bar Association Model Procurement Code for State and
1071 Local Government, numerous state laws and referenced in the FAR, Part 36.

1072 • **Remote Sensing:** Gathering and processing information about an object without direct physical
1073 contact.

1074 • **Rectified Imagery:** Imagery that has been transformed and processed to be projected onto a
1075 common surface. Historically the geospatial term of rectification was defined as the process of
1076 correcting a photograph for displacement due to camera tilt only. Currently, the term is often used
1077 more generally to apply to a wider array of transformation processes used to project imagery onto a
1078 common coordinate system. "Ortho-rectified" imagery is corrected for camera tilt, distortion and
1079 terrain relief. "Rectified imagery" is a more general term and implies that a less robust
1080 transformation, which typically would not directly correct for terrain relief.

- 1081 • **Referential Mapping:** Mapping that does not represent authoritative locations or survey data. This
1082 mapping is for reference purposes only and not for the purpose of determining reliable locations to
1083 be used as the basis for making measurements or other determinations. Locations of features are
1084 approximate (i.e., relative) and are not expected to comply with a specific positional accuracy
1085 requirement. Refer to NCEES materials cited in the references section for further clarification and
1086 examples for applying this term.
- 1087 • **Specification:** (often abbreviated as **spec**) is an explicit set of requirements to be satisfied by a
1088 material, product, or service. Should a material, product or service fail to meet one or more of the
1089 applicable specifications, it may be referred to as being *out of specification*; Specs are a type of
1090 technical standard.
- 1091 • **Standardization:** is the process of developing and implementing technical standards.
- 1092 • **Subscription Service:** This business model is where a customer must pay a subscription price to have
1093 access to the product or support service for a defined period of time. The content or service provider
1094 typically delivers to a set specification with support services to the clients' use.
- 1095 • **Technical Products:** Standardized products for specific tasks that do not require independent
1096 professional judgment and where the client is responsible for ensuring that outcome best meet
1097 customer and public interests.
- 1098 • **Technical Services:** Standardized services for specific tasks that do not require independent
1099 professional judgment, and where the client is responsible for ensuring that the scope of work and
1100 outcome best meet client and public interests.
- 1101 • **Value Added Service:** Services available at little or no cost, to promote and support their primary
1102 product. These support services can be delivered by the product provider, reseller, or third-party
1103 authorized agent for the product.
- 1104 • **Warranty:** In business and legal transactions, a warranty is an assurance by one party to the other
1105 party that specific facts or conditions are true or will happen; the other party is permitted to rely on
1106 that assurance and seek some type of remedy if it is not true or followed.
- 1107

1108 **Appendix 6:**
1109 **Other References**

1110 **References**

1111 ASPRS, 1987. Guidelines for procurement of photogrammetric services from private professional sources,
1112 *PE&RS*, 53(2), pp. 207-212.

1113

1114 **APPLICABLE QBS LAWS AND GENERAL INFORMATION**

1115 *Brooks Act (40 U.S.C. 1101), FAR 36.6:*

1116 http://www.acquisition.gov/far/current/html/Subpart%2036_6.html

1117 *American Institute of Architects, 2003 Summary of "Mini-Brooks Act" State QBS Laws*

1118 <http://www.aia.org/advocacy/state/aiab099560.pdf>

1119 *American Public Works Association Position Statement*

1120 http://www.apwa.net/Documents/Advocacy/Positions/Advocacy/Qualifications_Based_Select_Prof_Svcs_Consult.pdf

1122 *American Council of Engineering Companies description of QBS requirements for projects funded by*
1123 *federal grants*

1124 http://www.acec.org/advocacy/committees/qbs_matrix_8-16-04.cfm

1125 *American Council of Engineering Companies general QBS resources page*

1126 <http://www.acec.org/advocacy/committees/qbs.cfm>

1127 *U.S. Army Corps of Engineers Engineer FAR Supplement (EFARS definition of survey and mapping, refer to*
1128 *section 36.601-4)*

1129 http://www.acquisition.gov/far/current/html/Subpart%2036_6.html

1130

1131 **PROFESSIONAL SERVICES PROCUREMENT RESOURCES**

1132 *American Public Works Association "Red Book" on Qualifications-Based Selection Guidelines for Public*
1133 *Agencies*

1134 *(Document can be purchased from: <http://www.apwa.net/bookstore/>)*

1135 *American Bar Association Model Procurement Code for State and Local Government*

1136 *(Document can be purchased from: <http://www.abanet.org>)*

1137 *Michigan QBS Coalition, Workbook for QBS Procurement*

1138 http://www.qbs-mi.org/files/QBS_Workbook.pdf

1139 **ACCURACY AND PROFESSIONAL STANDARDS INFORMATION**

1140 *National Standard for Spatial Data Accuracy (NSSDA)*

1141 <http://www.fadc.gov/standards/projects/FGDC-standards-projects/accuracy/part3/chapter3>

1142 *ASPRS Code of Ethics*

1143 <http://www.asprs.org/About-Us/Code-of-Ethics-of-the-American-Society-for-Photogrammetry-and-Remote-Sensing.html>

1145 *ASPRS Certification Program*

1146 <http://www.asprs.org/Certification-Program.html>

1147 *ASPRS Standards Page*

1148 <http://www.asprs.org/Standards-Activities.html>

1149 **LICENSING INFORMATION**

1150 *ASPRS Licensure Committee*

1151 <http://www.asprs.org/PPD-Division/PPD-Licensure-Committee-Activities.html>

1152 *Council on Federal Procurement of Architectural & Engineering Services (COFPAES)*

1153 <http://www.cofpaes.org/>

1154 *NCEES link to State Engineering/Surveying Boards*

1155 <http://ncees.org/licensing-boards/>

1156 *NCEES Model Law*

1157 http://www.ncees.org/introduction/about_ncees/ncees_model_law.pdf

1158 *NCEES Model Rules*

1159 <http://cdn3.ncees.co/wp-content/uploads/2012/11/Model-Rules-2013.pdf>

1160 *NCEES Multi-Organization Task Force Materials and Reports*

1161 <http://www.asprs.org/NCEES-materials/NCEES-Task-Force-Materials.html>

1162