

Draft Guidelines for Procurement of A&E Services for Photogrammetric and Cartographic Work Using the Brooks Act

Professional Practice Division, American Society for Photogrammetry and Remote Sensing

PREFACE

THE ASPRS PROFESSIONAL PRACTICE DIVISION (PPD) has prepared these draft guidelines for the procurement of Architectural and Engineering (A&E) services using the Brooks Act. These guidelines were formulated in light of the Federal Office of Personnel Management Classification Standards for professional cartographers and cartographic technicians. The PPD would like to receive your comments on this draft no later than 31 December 1992. Please forward all comments to the Division in care of Mr. LeLand D. Whitmill, USDA Forest Service, GSC, 2222 W. 2300 South, Salt Lake City, UT 84119; phone 801-524-3233, fax 801-524-4577.

INTRODUCTION

Recent legislation requires procurement of professional Surveying and Mapping services using Brooks Act procedures. Certain photogrammetric and mapping functions fall in this category. It must clearly be determined what are, and what are not, professional services to enable compliance with the law and procurement regulations, and to facilitate orderly and uniform procurement of these contracts. The United States Office of Personnel Management, Position Classification Standards for Professional Cartographers and Cartographic Technicians was used in writing this paper. A final ruling on the Act is in process and is awaiting publication into the Federal Register.

PROFESSIONAL VS. TECHNICAL

The distinction between professional and technical activities hinges largely on the need for professional judgment, ability, and knowledge. The work of professional positions is creative, analytical, evaluative, or interpretive; and is characterized by personal responsibility to keep abreast of and exercise judgment and broad perspective in the application of an organized body of knowledge that is constantly studied to make new discoveries and interpretations and to improve the data, materials, and methods. Professional judgment involves and is characterized by application of (1) professional ability to apply scientific methodology to cartographic and photogrammetric problems, (2) a professional body of knowledge of photogrammetry and cartography, and (3) vigorous and continuing development of professional knowledge and ability, from experienced-tempered, higher level knowledge gained from education (usually but not necessarily formal). Technical activities, on the other hand, are marked by a practical knowledge of the processes, practices, methods, and techniques involved in the construction of new or revision of existing maps, charts, and related photogrammetric and cartographic products, learned in training (sometimes formal but very often on-the-job). Both judgment and skill are improved and increased by practical and varied experiences. They are not necessarily mutually exclusive, and in the real world mingle and can be blurred. Thus, there are many activities that are not purely professional nor technical,

but a mixture. For example, a surgeon performing an appendectomy utilizes professional judgment in placing the incision and evaluating the situation after it's made; he uses technical skill in making it and sewing it up. Applying this idea to the practice of photogrammetry should help sort out what is mostly professional, what is mostly technical, and what is somewhere in between.

WORK TO BE CONTRACTED UNDER THE BROOKS ACT PROCEDURE

Under this procedure the contracting agency should require contractors to have at least one professional photogrammetrist, such as a Certified Photogrammetrist (ASPRS) or equivalent, directly involved with and in charge of the work.

Brooks Act procedures should be used when the contractor assumes complete responsibility for the total process; e.g., site mapping including establishing control, portraying all features accurately, correcting mistakes, assuming third-party liability, etc.

Brooks Act procedures should also be used for foundation type work such as photogrammetric map revision, or aerotriangulation where this data is the basic foundation for a product and where other data can be added yielding other types of products.

When there is a mix of professional and technical duties needed to produce a map product, the Brooks Act procedure should be used. This classification could apply to a completed map or to a portion that is to be later incorporated into a finished product.

Requests for services to develop methods or systems (including software) to revise or produce map products, should also use Brooks Act procedures.

WORK TO BE CONTRACTED UNDER REQUEST FOR PROPOSALS (RFP)

Work performed under RFP should be inspected and accepted by a government professional certified or registered photogrammetrist, for compliance with standards. Under this category the contractor is not required to have a professional photogrammetrist directly involved with and in charge of the work.

When work is solely technical in nature, and the contractor provides minimal or no professional skills, or retains no third party responsibility for final products, or performs no analysis of process or results, the work should be procured under RFP. This includes work performed by para-professionals such as plotter operators. Typically, such work is performed using existing technologies, methods, systems and off-the-shelf software.

Map reproduction or conversion where contractor is furnished control and is required merely to transfer features from an existing map to another medium such as magnetic tape by hand digitizing or scanning, or to revise layers from furnished data, should not be classified as A&E service and should be procured under RFP.

SUMMARY TABLE OF TASKS USUALLY CONTRACTED

TASK	PROF. BROOKS	SVC. TECH. RFP	SVC. RFP
Aerotriangulation, complete service	X		
Aero Trig, routine control & pass-point selection & marking			X
Aero Trig, complex point selection and marking	X		
Aero Trig, mensuration only from furnished diapositives			X
Aero Trig, data processing and analysis	X		
Digital Terrain Modelling, complete service: Salient point/feature method	X		
Parallel profile method			X
Analogue compilation, complete service, graphic product	X		
Analogue comp, digital data product, routine systems			X
Analogue comp, digital data product, complex systems	X		
Analogue comp, control furnished, graphic product			X
Analytical comp, any service, digital or graphical product	X		
Orthophoto production, complete service	X		
Ortho projection only, DEM and control furnished			X
Polygon digitizing for GIS, control furnished			X

RATIONALE

AEROTRIANGULATION

Control: Selection, placement, evaluation, and weighting of position quality requires professional judgment. Proper application of grid systems and vertical control requires knowledge of geodesy. An understanding of error propagation theory is needed. These knowledges go beyond technician requirements.

Pugging: Pass and tie point selection, identification, and placement requires technical/professional judgment, depending on the complexity of the project (photography type and quality, scale, contrast, etc). Marking is a technical skill, but it is performed in conjunction with selection and placement.

Mensuration: Reading the pass, tie, and control points is primarily a technical skill in operating measuring devices.

Processing: Data processing is a technical skill, but interpreting results and planning curative treatment, which is inevitably needed, requires judgment and professional knowledge.

Summary: The foundation of all photogrammetric and mapping operations is aero triangulation. Mistakes made in AT are difficult to detect during subsequent cartographic phases, and become latent defects with potential later severe consequences in map and digital data quality and accuracy. Taken as a whole, AT is definitely a professional activity, even though aspects of the process are primarily technical.

DIGITAL TERRAIN MODELLING

Model set-up: Mostly technical. Some judgment required in selecting coverage to digitize within the model.

Data collection: Professional judgment required if salient point/feature digitizing is used. Selection of salient points/features requires knowledge of processing software, and discretion to achieve terrain model validity. However, if parallel profile method is used, less judgment is required. Technical skill is needed for instrument operation, in either case.

Data transmission and processing: Mostly technical; but professional

judgment required in cases where problems in data sufficiency arise. This would most likely occur with salient point digitizing.

Summary: Slightly more technical to mostly professional, depending upon technique used, and type of terrain. Salient point methods generally yield a better terrain model with fewer points, leading to efficiencies in processing, but require higher level judgment to achieve this advantage.

START-TO-FINISH MAPPING OF SITES OR OBJECTS

Summary: Clearly professional, since each and every project is unique, requiring a custom product; therefore requires professional judgment in design of processes and evaluation of results.

ANALOGUE COMPILATION/MAP REVISION

Model set-up: Mostly technical, particularly when control furnished. Without control, selecting and scaling to existing map features is required. This calls for care in feature selection, but usually this is straightforward.

Compilation: Technical. Requires good hand-eye coordination and mechanical skill. Manual drafting is involved.

Summary: Generally a technical activity unless combinations of two or more abnormal problems with photos are generally present, such as excessive differential tilt, excessive b-z or b-y, low contrast or poor quality imagery, or sparse or faulty control.

ANALYTICAL COMPILATION

Model set-up: Mostly professional when advanced systems (such as superimposition) which require special techniques such as importing and correlating of existing digital data files, are used.

Compilation: Technical.

Data transmission, editing, and manipulation: Complex analytical systems require more knowledge and judgment, making this phase a professional activity.

Summary: Complex analytical systems make this more professional than technical. Also, the same problems discussed in analogue compilation apply. The trend of photogrammetry towards fully analytical/digital processes should result in more of these professional services being contracted.

ORTHOPHOTO PRODUCTION

Summary: A professional service as usually contracted (start-to-finish). This is partially so because of the knowledge required to bring sub-standard results into conformance. Professional level knowledge of photogrammetry, computer processing, photography and photographic reproduction, and physics is required.

GRAPHICS DIGITIZING

Summary: A technical service as usually contracted. The contractor is furnished all materials, and computer systems are specified. Little judgment on the part of operators is required.

QUALIFICATIONS

Firms offering services must provide evidence of capabilities. In evaluating potential contractors, the government agency should consider qualifications of contractor personnel such as:

- Education and training, both formal and on-the-job.
- Evidence of maintenance of skills and knowledge of changes in the technology through continuing education or professional society activities.
- Number of years experience in the specific activity.
- Professional Society Certification, or State Registration or Licensing.
- Reputation in peer group.

You can receive a copy of **PE&RS** each month by joining **ASPRS**. Additional membership benefits include discounts on: classified advertisements, publications, exhibit spaces and registration, and mailing lists. To become an **ASPRS** member call Anne Ryan or Sokhan Hing at 301-493-0290 today!