



## Geospatial Management Competency Model

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### Background

The Geospatial Management Competency Model (GMCM) specifies 74 essential competencies and 18 competency areas that characterize the work of most successful managers in the geospatial industry. It is not intended to be an exhaustive inventory of all pertinent competencies, such as those specific to particular work settings. Instead, the GMCM seeks to distill a concise list that is widely applicable, and readily adaptable to evolving industry needs.

The GMCM is an element of the U.S. Department of Labor Employment and Training Administration's (DOLETA's) Competency Modeling Initiative (<http://www.careeronestop.org/competencymodel/>). For DOLETA, a "competency" is *the capability to apply or use a set of related knowledge, skills, and abilities required to successfully perform "critical work functions" or tasks*. A "competency model" is *a collection of competencies that together define successful performance* (Ennis 2008). The Competency Modeling Initiative promotes the development of industry-driven competency models in high-growth, high-demand industries. DOLETA identified "geospatial technology" as a high-growth industry in 2003.

In 2010, DOLETA issued a Geospatial Technology Competency Model (GTCM) that specifies the foundational (Tiers 1-3), industry-wide (Tier 4), and industry sector-specific (Tier 5) expertise characteristic of the various occupations that comprise the geospatial industry (<http://www.careeronestop.org/CompetencyModel/pyramid.aspx?GEO=Y>). Descriptions of individual geospatial occupations, including occupation-specific competencies and job requirements (Tiers 6-8), are published in DOLETA's O\*NET occupation database (<http://www.onetonline.org/>). The GMCM corresponds to Tier 9 of the GTCM.

### Intended Uses

Competency models are used to guide individual professional development, to help people in move up or over in an organization or industry, to help educators and trainers develop curricula that address workforce needs, to inform development of interview protocols, as requirements for professional certification, and as criteria for academic program accreditation and articulation (PDR and Aguirre International 2005).

### Matrix Format

The GMCM is presented below in matrix form. The 74 matrix rows correspond to the Task Force's consensus minimum number of critical work functions that most geospatial managers need to be able to perform. Both general competencies and competencies particular to the geospatial industry are included.

Columns correspond to 18 competency areas are clusters of critical work functions that share a common focus or intended outcome. Although associations between competencies and competency areas are indicated, users should bear in mind that these associations vary from one job setting to the next.

## Development Process

Practicing geospatial managers developed the GMCM with input from workforce development experts at DOLETA and in light of comparable models produced for kindred fields. A GMCM Task Force (listed below) produced the final version for DOLETA following its analysis of comments received during a public review period. The Urban and Regional Information Systems Association (URISA) orchestrated the effort in cooperation with DOLETA.

URISA's Board of Directors first proposed to organize a GMCM in a letter to DOLETA in December 2010. With DOLETA's consent, URISA Board member Greg Babinski organized a day-long work session at the Washington State GIS Conference in May 2011 to prepare a preliminary "strawman" draft GMCM. Participants (listed below) also suggested refinements to URISA's GIS Capability Maturity Model (Babinski 2010-11).

Then in November, 2011, during its annual GIS-Pro conference in Indianapolis, IN, URISA conducted a day-long workshop to refine and validate the strawman draft. Session organizers David DiBiase, Pat Kennelly, and Babinski identified a Task Force of twelve experienced geospatial managers and one facilitator (DiBiase) to produce a revised draft GMCM suitable for public review. All but two invitees volunteered to participate, and all at their own expense. (Participants are listed below.) DOLETA representatives greeted and encouraged the volunteers by telephone from Washington DC at the outset of the workshop.

Before, during, and after the workshop, Task Force members reviewed several comparable competency models. A preliminary list of fifteen management competency areas proposed by workforce analysts at DOLETA provided a starting point. The four competency clusters in HayGroup's Manager Competency Model (HayGroup 2001) – managing yourself, managing your team, managing the work, and managing collaboratively – guided the Task Force to consider the full spectrum of geospatial management issues. The U.S. Office of Personnel Management's IT Project Management competency model (OPM 2011) provides an extensive list of general and technical competencies that helped the Task Force validate the content of the GMCM. Task Force members were also acquainted with the Project Management Institute's *Project Management Body of Knowledge*.

The outcome of the Indianapolis Task Force workshop was a revised draft GMCM. The draft underwent seven further revisions through February 21, 2012 when Task Force members finally reached consensus on a draft suitable for public review. The draft GMCM was made available for public comment (via an online questionnaire) at the URISA web site from February 22 through March 31. URISA invited participation in the review through a press release and social media campaign.

DiBiase analyzed a total of 100 responses to the public review questionnaire. Ninety-four responses were found to be authentic. The geographic distribution of responses included 80 responses from 32 U.S. states, 10 responses from 5 Canadian provinces and 5 responses from 4 other countries (Egypt, India, Pakistan, Peru). Respondents' self-report job titles included "Manager" (24 responses, mostly "GIS Manager" or "Project Manager"), "Coordinator" (15, mostly "GIS Coordinator"), "Analyst" (10, mostly "GIS Analyst") and "Administrator" (6, mostly "GIS Administrator"). Sixty-two percent of respondents report more than five years of experience as geospatial managers. Nearly half (46%) reported over 10 years of experience.

Majorities of respondents expect the GMCM to be useful as a guideline for assessing individual professional development (76% of respondents) and as a resource for raising awareness about the geospatial field (57%). Over 90% of respondents judged the draft document to be acceptable as is or with minor revisions. Eighty-five percent considered URISA Task Force members as “qualified” or “Highly qualified” to create the document.

The Task Force revised the draft GMCM in response to public comments and suggestions, including a painstaking analysis by John Johnson of the National Geospatial Technology Center (GeoTech Center)—the group that led the development of the Geospatial Technology Competency Model (GTCM). The Task Force edited, added and deleted some competencies and competency areas. It also adopted the matrix format in response to feedback that the GMCM did not specify which competencies belonged to which competency areas. Reaching consensus about those associations was more difficult for the Task Force than identifying the competencies and competency areas. However, majorities of Task Force members supported each of the associations shown in the final matrix.

## **Contributors**

### **GMCM Task Force** (November 2011 - June 2012)

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### **GMCM Strawman Task Force** (May 2011)

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## URISA

The Urban and Regional Information Systems Association's (URISA's) qualifications to organize the GMCM effort include its nearly 50-year history as one of the founding organizations of the GIS profession, its successful organization of the GIS Certification Institute and the URISA Leadership Academy, and its healthy working relationships with other professional and scientific associations in the geospatial field through the Coalition on Geospatial Organizations (COGO).

## Additional Resources

Babinski, G. (2010-11). URISA Proposes GIS Capability Maturity Model. *ArcNews*, Winter 2010/11. <http://www.esri.com/news/arcnews/winter1011/articles/urisa-proposes.html>

Croswell, P. (2009). *The GIS Management Handbook: Concepts, Practices, and Tools for Planning, Implementing, and Managing Geographic Information System Projects and Programs*. Kessey Dweitt Publications.

DiBiase, D., T. Corbin, T. Fox, J. Francica, K. Green, J. Jackson, G. Jeffress, B. Jones, B. Jones, J. Mennis, K. Schuckman, C. Smith, and J. Van Sickle (2010). The New Geospatial Technology Competency Model: Bringing Workforce Needs into Focus. *URISA Journal* 22:2, 55-72. [https://www.education.psu.edu/files/sites/file/DiBiase\\_etal\\_2010\\_GTCM\\_URISA\\_Journal.pdf](https://www.education.psu.edu/files/sites/file/DiBiase_etal_2010_GTCM_URISA_Journal.pdf)

Ennis, M. R. (2008). Competency Models: A Review of the Literature and the Role of the Employment and Training Administration (ETA). [http://www.careeronestop.org/COMPETENCYMODEL/info\\_documents/OPDRLiteratureReview.pdf](http://www.careeronestop.org/COMPETENCYMODEL/info_documents/OPDRLiteratureReview.pdf).

HayGroup (2001). The Manager Competency Model. <http://www.professional-learning.com/MCPBriefGuide.pdf>

PDRI, Inc., and Aguirre International (2005). Technical Assistance Guide for Development and Using Competency Models—One Solution for a Demand-Driven Workforce System. [http://www.careeronestop.org/competencymodel/Info\\_Documents/TAG.pdf](http://www.careeronestop.org/competencymodel/Info_Documents/TAG.pdf).

U.S. Office of Personnel Management (2011). Competency Model for IT Program Management. <http://www.chcoc.gov/transmittals/TransmittalDetails.aspx?TransmittalID=4058>

	Geospatial Technology Competencies	Self-Management	Human Resource Management	Performance Management	Legal Affairs and Policy Management	Communication	Team Management	Relationship Management	Business Development	Leadership	Professional Development	Strategic Planning and Action	Work Management	Geospatial Project Management	Political Skills	Contract Management	Financial Management	Asset Management
1. Keep up with technology trends and standards	●	●									●							
2. Keep abreast of developments that affect your organization		●										●			●			
3. Apply sound decision making practices		●					●					●		●			●	
4. Assess and improve your skills and performance regularly		●									●							
5. Develop a geospatial staffing plan to meet business needs			●										●					
6. Recruit and hire competent geospatial and support staff			●															
7. Define geospatial work functions and assign appropriate staff			●				●							●				

**URISA** Geospatial Management Competency Model

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8. Establish clear performance expectations				•									•					
9. Maintain individual and organizational accountability				•									•					
10. Acknowledge and encourage exceptional achievement				•														
11. Remediate performance shortfalls effectively				•									•	•				
12. Avoid conflicts of interest—actual and apparent					•													
13. Comply with all relevant laws and regulations					•											•		
14. Follow relevant professional codes of ethics					•					•								
15. Communicate effectively in all forms, formats, and media						•	•			•								
16. Communicate effectively to all sizes and types of audiences						•		•		•								
17. Communicate the value of geospatial technology to decision makers and stakeholders	•					•			•	•								
18. Foster an environment conducive to teamwork							•							•				

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19. Assemble, charge, and enable effective work teams				•			•							•				
20. Help resolve conflicts among team members							•											
21. Develop and maintain long-term client relationships								•	•						•			
22. Develop and maintain collaborative relationships within the organization								•							•			
23. Develop and maintain relationships with other organizations to promote mutually advantageous partnerships and best practices								•										
24. Identify business opportunities									•									
25. Evaluate risk of new ventures									•									
26. Assess competition									•									
27. Conduct client-focused needs evaluation									•									
28. Develop business case and plan for developing and marketing new ventures									•									
29. Develop and maintain strategic partnerships								•	•									

**URISA Geospatial Management Competency Model**

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30. Develop, promote, and protect the organization's brand									●									
31. Lead creative thinking about geospatial technology opportunities										●		●						
32. Articulate a geospatial technology vision for the organization						●				●		●						
33. Communicate geospatial program goals to stakeholders						●		●		●								
34. Build consensus								●							●			
35. Foster a culture of employee-driven process improvement							●			●								
36. Mentor staff and colleagues							●				●							
37. Prepare and implement a geospatial staff competency plan			●								●							
38. Provide opportunities for continuing professional development											●							
39. Encourage contributions to the profession											●							



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40. Develop a strategic plan with measurable goals and specific actions												•						
41. Implement a strategic planning cycle												•						
42. Align geospatial activities to support the organization's strategic plan												•						
43. Adjust the plan in response to changing environment												•						
44. Apply QA/QC best practices													•	•				
45. Ensure continuity of geospatial operations			•							•		•						
46. Monitor stakeholder satisfaction													•					
47. Improve efficiency													•					
48. Adopt a customer service orientation													•					
49. Apply project management knowledge and best practices														•				

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50. Understand and apply the geospatial technology components of projects (as outlined in the Department of Labor's Geospatial Technology Competency Model) to accurately establish scope, resources, schedule and quality requirements for project success	•												•	•				
51. Identify collaborative opportunities to achieve project goals								•						•	•			
52. Manage a portfolio of projects effectively													•	•				
53. Cooperate within political and professional organizations								•							•			
54. Pursue goals tactfully in context of particular organizational cultures and governance structures								•							•			
55. Identify potential political champions and engage their support								•		•					•			
56. Respect jurisdictional responsibilities															•			

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57. Champion policies that respect the purposes and roles of public, private, nonprofit, and academic organizations								•							•			
58. Prepare, negotiate, monitor, administer, and remediate contracts																•		
59. Prepare Statements of Work (SOW) defining project objectives and requirements																•		
60. Prepare competitive solicitations including project rationale and objectives, existing geospatial technology assets, desired services, and final deliverables	•															•		
61. Prepare proposals including understanding of need, technical approach and proposed technology, final deliverables, schedule, budget, and relevant qualifications	•															•		
62. Prepare objective selection criteria and scoring mechanism to fairly evaluate proposals																•		
63. Develop service level agreements																•		
64. Prepare and document budgets																	•	

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65. Manage expenditures and income																	•	
66. Identify funding sources and obtain funding, including collaborative opportunities								•									•	
67. Develop and manage a long term financial plan												•					•	
68. Conduct regular financial analyses																	•	
69. Implement standard financial accounting procedures and controls					•												•	
70. Assure accountability by periodic independent audits																	•	
71. Understand enterprise geospatial architecture	•																	•
72. Ensure that geospatial technology infrastructure meets organization needs	•																	•
73. Recognize geospatial data as a capital asset	•																	•

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<p>74. Manage the asset lifecycle:</p> <ul style="list-style-type: none"> <li>a. Establish and maintain an up-to-date asset inventory</li> <li>b. Procure and upgrade assets</li> <li>c. Implement and periodically audit security procedures for assets such as work spaces, equipment, computer networks, data, and software</li> <li>d. Implement computer system back-ups and periodically test reliability of backup procedures</li> <li>e. Implement sound data management procedures</li> </ul>																			●