General Knowledge

Accuracy
ASPRS standards
Biophysical properties
Cartographic principles
Coordinate systems
Datums
Digital stereography
Electromagnetic spectrum
GCPs – ground control points
Geographic principles
GNSS basics
Graphic design
HTML
ISO standards/protocol
Map projections
Map algebra
NMAP Standards
NSSDA standards
Output formatting
Physics, introductory
Precision
Process work flow
Raster / vector
Resolution (spatial, spectral, temporal, radiometric)
Sensor types & characteristics
Spatial Statistics
Statistics
Surveying basics
Technical writing
Trigonometry
Visual enhancements of data
Working in secure environment

Skills

Adaptable to change
Business communication
Common sense
Conflict resolution
Continuing education
Coping skills
Critical thinking
Facilitation
Group work/facilitation
Interviewing
Plotter set-up
Presentation
Problem solving
Professional development
Programming
Self-starter
Spatial thinking
Team player
Time management
Trouble-shooting
Writing

Worker Behaviors

Accept / provide constructive criticism
Analytical
Attention to detail
Common sense
Concise
Cooperative
Coping
Detail oriented
Discretion
Ethical
Inquisitive
Life-long learner
Long work hours
Mutual respect
Non-color blind
Non-stereo blind
Proactive attitude
Self-motivated
Self-quality control
Self-starter
Sense of humor
Team player

Tools, Equipment, Supplies and Materials

Acrobat connect
Adobe suite
Arc2Earth
ArcGIS
CADD-AutoCAD/Microstation
eCognition
ENVI
Feature analyst
Geomedia
GeoCue
GLOBAL MAPPER
Google Earth
GNSS instruments
IDL
Illustrator
Imagine
LiDAR analyst
LiDAR tools
MS office
Open Source
PCI
Photoshop
Plotter
Python
Socket set/GXP
SQL
Tatuk GIS

Future Trends

Augmented reality
BIM – building information modeling
Cloud computing
Crowd sourcing
ECEF – earth centered earth fixed
Enterprise architecture
Free-ware/open source software
GNSS–Global Navigation Satellite System
GPU computing – graphical processing units
Off-shoring
Real-time monitoring
Remote work environment
Sensor web
Shift work

Acronyms

AGNSS – Aerial GNSS
AOI – Area of Interest
ASPRS – American Society for Photogrammetry and Remote Sensing
DEM – digital elevation model
DSM – digital surface model
DTM – digital terrain model
FTP – file transfer protocol
GCP – ground control point
GeoTiff – TIFF image format with imbedded geographical reference info.
GNSS–Global Navigation Satellite System
IMU – inertial measurement unit
INS – Inertial Navigation System
IR – infrared
ISO – International Organization for Standardization
LiDAR – Light Detection And Ranging
Mashup - Web page or application that uses and combines data, presentation or functionality from two or more sources to create new services.
NIR – near infrared
NMAP- Network Mapper
NSSDA- National standard for spatial data accuracy
SOP – standard operating procedures
TFW – (TIFF World File) a secondary file with georeferencing information that is used by a standard TIFF image
TIFF – tagged image file format
TIN – triangulated irregular network
VI – vegetation index

DACUM Research Chart for Remote Sensing Specialist

DACUM Panel

Sanchit Agarwal, Director Technical Quality, Sanborn Mapping Inc., Colorado Springs, CO
Dawn R. Betz, Production Coordinator, Digital Globe, Longmont, CO
Mark Bowersox, Technical Application Engineer, ITT Visual Information Solutions, Boulder, CO
Travis Clemens, Project Manager, Senior Navigation Information Analyst, Jeppensen Air Navigation, Englewood, CO
Linda Meyer, Senior Geospatial Analyst, GeoEye, Commercial Production, Thornton, CO
Carol Mladinich, Research Physical Scientist, U.S. Geological Survey, Rocky Mountain Geographic Science Center, Lakewood, CO
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Demetrio Zourarakis, Remote Sensing & GIS Analyst, Kentucky Division of Geographic Information, Commonwealth Office of Technology, Frankfort, KY

DACUM Facilitators

John Johnson, Facilitator
Mark Lombardi, Recorder

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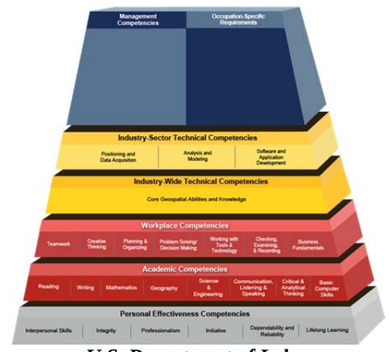

U.S. Department of Labor
Geospatial Technology Competency Model

Date: September 14 & 15, 2011

DACUM Research Chart for Remote Sensing Specialist

September 14 & 15, 2011

Duties	Tasks												
A **Manage Programs**	A1 Contribute to company's strategic plan	A2 Allocate resources (time/people /$)	A3 Document procedures	A4 Contribute to the hiring procedures	A5 Evaluate employees	A6 Interact with co-workers *	A7 Interact with client	A8 Write proposals					
B **Develop Project Plan**	B1 Determine area of interest	B2 Determine data specifications (goals, collection requirements & parameters)		B3 Evaluate data request feasibility	B4 Research data sources *	B5 Research technology *	B6 Develop project budget (resources, $, time, people)	B7 Create templates (databases, data attributes, work flow)		B8 Monitor project status	B9 Evaluate project	B10 Streamline workflow (Increase efficiency)	
C **Manage Data**	C1 Setup file structure	C2 Create geospatial database(s)	C3 Migrate data to new environment	C4 Maintain geospatial database(s) *	C5 Maintain image library *	C6 Create backup (fail-over) *	C7 Archive data *	C8 Respond to data requests *					
D **Manage hardware and software**	D1 Administer security protocols	D2 Maintain computer hardware	D3 Maintain software (licensing, install, update)		D4 Maintain field hardware (GNSS, sensors, planes)		D5 Decommission services (website, links, hardware, files)						
E **Acquire Data**	E1 Order data (parameters: capture, task, archival, ancillary) *		E2 Collect ground reference data *	E3 Establish horizontal and vertical control (AGPS, INS, GCPs, tie points, etc.)		E4 Perform quality control on data acquired							
F **Produce Data**	F1 Setup project environment	F2 Monitor project environment (troubleshoot, versioning)		F3 Edit DEMs	F4 Ingest data *	F5 Calibrate date (radiometric & geometric, atmospheric correction)		F6 Georeference data (GNSS, INS) *	F7 Peform ortho-rectification *	F8 Co-register data (vertical registration) *	F9 Enhance image for visual interpretation	F10 Conduct seam line generation and editing for mosaicking *	
F **Produce Data (con't)**		F11 Assemble spatial extent (mosaic, subset, tiling, mask)		F12 Perform point cloud classification (automated macro filtering) *		F13 Create intensity image (LiDAR)	F14 Format data (compression, interleave) *						
G **Generate Products**	G1 Conduct quantitative analysis on active sensor data		G2 Conduct quantitative analysis on passive sensor data		G3 Conduct visual interpretation	G4 Perform mensuration *	G5 Integrate non-spatial data *	G6 Perform geostatistical analysis	G7 Perform change detection	G8 Perform stereo compilation *	G9 Perform 3D modeling	G10 Create fly-throughs	G11 Derive topographic products
G **Generate Products (con't)**		G12 Create surface models (TINs, DSMs, DTMs)		G13 Perform vector (feature) extraction *	G14 Perform vector editing /clean up (build topology) *		G15 Automate production (scripting, models, programming)		G16 Create and run definition queries	G17 Build mashups	G18 Develop presentation graphics (graphs, power point) *		G19 Populate metadata *
H **Assure Quality**	H1 Perform image quality assessment	H2 Assess relative accuracy and precision	H3 Assess absolute accuracy and precision	H4 Assess attribution accuracy *	H5 Assess classification accuracy	H6 Enforce topology	H7 Perform error trapping (systematic errors)	H8 Verify project completeness	H9 Verify customer satisfaction (client meetings)				
I **Disseminate Products**	I1 Prepare deliverables (compile) *	I2 Ensure adequate security for product dissemination		I3 Deliver Media (hard drive, DVD) *	I4 Post deliverables to FTP and server *	I5 Post deliverables to website or map service (wiki, cloud) *		I6 Inform client of delivery	I7 Train client on product				
J **Develop Professionally**	J1 Attend training (classroom, on-line, on-the-job, job shadow) *		J2 Conduct training (job shadow) *	J3 Pursue professional certification *	J4 Participate in conferences, seminars and workshops *		J5 Pursue advanced degree *	J6 Participate in mentoring program *	J7 Contribute to publications *	J8 Perform public speaking *	J9 Provide professional outreach *	J10 Network with other Professionals *	

***** **Entry level**