

# DACUM Research Chart for Remote Sensing Specialist

May 1 & 2, 2011

Duties		Tasks													
<b>A</b>	<b>Project Planning</b>	A1 Identify project deliverables	A2 Prepare project scope & methodology	A3 Coordinate with client	A4 Identify study area	A5 Identify data sources (needed & available)	A6 Identify needed resources (software, servers, personnel, equipment...)	A7 Conduct background research	A8 Create sampling strategy	A9 Prepare schedule / timeline	A10 Prepare quality plan	A11 Prepare budget	A12 Write proposals & grant applic. to secure funding	A13 Devise contingency plan (data, resources,gaps)	
<b>B</b>	<b>Manage Projects</b>	B1 Inventory personnel skills	B2 Select project personnel	B3 Coordinate project resources (staff, software, hardware)		B4 Assign tasks to personnel	B5 Conduct kick-off meeting /orientation	B6 Track project milestones (funding, costs)	B7 Prepare progress reports	B8 Conduct project meetings	B9 Troubleshoot problems	B10 Identify & implement process improvements	B11 Evaluate staff performance (safety, interns)		
<b>C</b>	<b>Manage Systems</b>	C1 Coordinate with IT and R&D personnel (internal & external)		C2 Allocate server space	C3 Install/update software (configure license server, field equipment)		C4 Backup / restore data to / from off-site archive	C5 Calibrate Sensors	C6 Configure field equipment (GPS, magnetometer, sensor installation)						
<b>D</b>	<b>Acquire Data</b>	D1 Create Site Maps *	D2 Query on-line resources (archives, private...)*	D3 Query hardcopy resources (archives) *	D4 Select data type(s) based on scope of work	D5 Obtain clearances (flight, ground permissions, customs)		D6 Establish control networks	D7 Conduct field campaigns *	D8 Conduct Flight surveys	D9 Conduct ground truthing *	D10 Order data *	D11 Download data *	D12 Create coverage index *	D13 Resolve data issues
<b>D</b>	<b>Acquire Data (con't)</b>		D14 Scan data *	D15 Check data validity											
<b>E</b>	<b>Manage Data</b>	E1 Create data storage structure (geodatabase, working directory, topology rules)		E2 Import data	E3 Extract image & data layers *	E4 Convert data format (raster/vector) *	E5 Reformat data *	E6 Organize data (rename, index volumes) *	E7 Assign access permissions	E8 Stage data access	E9 Create metadata structure	E10 Backup / Restore data to / from local archive *			
<b>F</b>	<b>Process Data</b>	F1 Adjust GNSS ground control network	F2 Convert waveform data to points (LIDAR)	F3 Create airborne trajectory	F4 Output LAS files	F5 Digitize / vectorize data *	F6 Orthorectify /rectify data (raster, vector, geocorrect)	F7 Perform image enhancement (pan sharpening, tonal balance, atmospheric correction, edge enhancement, transformation) *		F8 Remove noise from raster / LIDAR data (spikes, bands, speckles) *		F9 Reproject & transform data *	F10 Generalize vector data (smooth) *	F11 Resample image data *	F12 Extract areas of interest (clip, subset, crop) *
<b>F</b>	<b>Process Data (con't)</b>		F13 Create mosaics *	F14 Create a difference image (math tools)	F15 Implement scripts (write, customize)										
<b>G</b>	<b>Integrate Data</b>	G1 Create 3D / stereo images *	G2 Summarize values in a grid (aggregate) *	G3 Display maps and data on raster dataset *	G4 Link / hyperlink data *	G5 Tabulate area attributes *									
<b>H</b>	<b>Analyze Data</b>	H1 Create ratio images (NDWI, NDVI, MSI, LAI, EVI, snow, tassal cap transformations)		H2 Conduct data sampling	H3 Create raster training sets	H4 Classify data	H5 Create video fly through	H6 Conduct change detection *	H7 Extract features *	H8 Conduct trend analysis	H9 Conduct wetlands analysis	H10 Conduct fracture trace & lithology analysis	H11 Perform proximity analysis	H12 Model land surface characteristics	H13 Verify results of analysis using ground truth
<b>H</b>	<b>Analyze Data (con't)</b>		H14 Conduct cultural resource analysis	H15 Conduct emergency response analysis	H16 Conduct line of sight analysis *	H17 Quantify features	H18 Develop a predictive planning model (urban sustainability model)		H19 Conduct accuracy assessment	H20 Verify sensor calibration	H21 Create site suitability maps		H22 Validate analysis results		
<b>I</b>	<b>Disseminate Results</b>	I1 Prepare written reports/documentation	I2 Create cartographic maps *	I3 Prepare exhibits (graphics, tables, charts, imagery, annotation)		I4 Publish metadata *	I5 Upload files *	I6 Publish final papers	I7 Present findings face to face	I8 Present findings virtually					
<b>J</b>	<b>Professional Development</b>	J1 Acquire professional certification	J2 Read professional literature	J3 Conduct training (external/internal)	J4 Attend training *	J5 Attend professional events *	J6 Give presentations at professional events (community colleges)		J7 Pursue advance degrees / certificates *	J8 Develop personal skills & qualifications *					* Entry Level Task

## General Knowledge

Basic photogrammetry  
Cartography  
File formats  
Geodesy  
Geography  
GIS  
GNSS  
LIDAR  
Math  
Office software suite  
Physics  
Principles of image processing  
Principles of land surveying  
Principles of remote sensing  
Programming  
Projections & coordinate systems  
Scripting  
Statistics  
Terrain analysis  
Zonal statistics

## Tools, Equipment, Supplies and Materials

Aerial photographs  
Analysis tools  
Computers  
Conversion tools  
Geodatabase  
Plotters  
Raster math tools  
Scanners  
Spatial Analyst  
Stereoscopes

## Skills

Apply raster math tools  
Computer Aided Design  
CAD  
Cartography  
Critical thinking  
GIS  
Image processing  
Information Technology (IT)  
Organizational  
Problem solving  
Ability to see in 3-D  
Team work  
Tech savvy  
Verbal communication  
Written communication

## Worker Behaviors

Analytical  
Creativity  
Detail oriented  
Determined  
Flexible  
Focused  
Improvise / resourceful  
Optimistic  
Organized  
Patience  
Positive attitude  
Self-starter  
Take initiative  
Tenacity  
Willingness to change  
Willingness to learn  
Work independently  
Work long hours  
Work with others

## Future Trends and Concerns

Accelerated aging of data  
Auto calibration routines  
Auto segmentation routines  
Availability and accessibility of data on a global scale  
Cloud computing  
Data overload (exponential growth)  
Difficulty in data navigation  
Growth in automated software and tools  
Growth of IT capacity  
LIDAR – cutting edge / growth industry  
More geospatial technology in consumer products  
Open source software  
Preservation of historic records  
Stronger sensors, higher resolution (LIDAR)

## Acronyms

AOI – Area of Interest  
BIL – Band Interleaved by Line  
BSQ – Band Sequential Format  
CAD - Computer Aided Design  
EVI – Enhanced Vegetation Index  
FCC – False Color Composite  
GIS – Geographic Information System  
GNSS - Global Navigation Satellite System  
IHS – Intensity Hue Saturation

IMU – Inertial Measurement Unit  
INS – Inertial Navigation System  
LAI – Leaf Area Index  
LIDAR - Light Detection And Ranging  
MSI – Moisture Stress Index  
NDVI – Normalized difference Vegetation Index  
NDWI – Normalized Difference Water Index  
ROI – Region of Interest

# DACUM Research Chart for Remote Sensing Specialist

## DACUM Panel

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Mary Sitton, President, Imagery  
Analyst, CMS, Environmental  
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## DACUM Facilitators

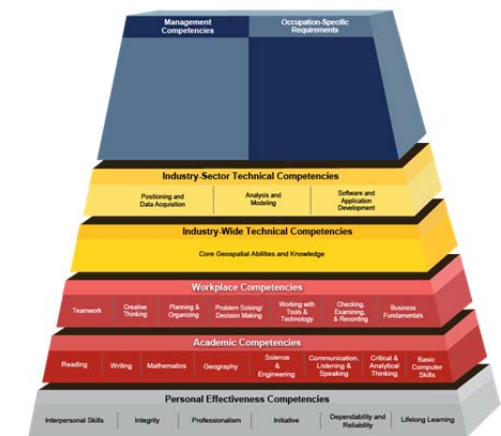
John Johnson, Facilitator  
Ann Johnson, Recorder  
Jeannie Allen, Recorder

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