



## **Directing Outputs to Enable Concurrent Job Processing**

One of the main benefits of the TNTmips Job Processing System (JPS) is that it allows you to easily run multiple concurrent processes to maximize the use of your computer's multiple processor cores. The JPS Job Manager allows you to specify the maximum allowed number of concurrent jobs and to manage and monitor the progress of these jobs (see the Technical Guides entitled *System: Managing Job Processing* and *System: Managing the Job Queue*).

Multiple jobs can be run concurrently using the JPS, limited by the value you set for the Maximum Running Jobs parameter. However, only one TNTmips process (and thus only one job) can write to a specific output file at a time. If you start a series

of jobs that direct their outputs to the same file, the JPS will automatically run them one by one, rather than concurrently, regardless of your Maximum Running Jobs parameter setting. Jobs that are currently blocked from running due to contention for the same file remain in the job queue with their status set to Blocked. These blocked jobs are run in the order shown in the Job Manager's Status column, which you can control by changing their priorities as discussed in the TechGuide entitled *Managing* the Job Queue. If blocked jobs are followed in the Oueue by

🛠 Job Manager								- <b>D</b> ×
Pending Done Failed	Scheduled Settings	1						
Select All Tasks r	not running Queue	Hold Delete Run Now	Schedule Job	_ 🖆 🛃 🖆	🛃 🛛 Tasks i	running Pause	Resume	Cancel
Status - Priority	ID	Nane		Process ID	Run Time	Progress		<u> </u>
🖂 Running 10	20140224_100657_01	Raster Extract		(6/6)	21			
Running 10	20140224_100657_02	p045r027_20000716.rvc	/ Band1	1004	21			
Blocked 10	20140224_100657_03	p045r027_20000716.rvc	/ Band2					
Blocked 10	20140224_100657_04	p045r027_20000716.rvc	/ Band3					
Blocked 10	20140224_100657_05	p045r027_20000716.rvc	/ Band4					
Blocked 10	20140224_100657_06	p045r027_20000716.rvc	/ Band5					
Blocked 7 10	20140224_100657_07	p045r027_20000716.rvc	/ Band7					
Conft run job at this time. Output RasterExtract.rvc is currently being used as output for 20140224_100657_02 job.								
<b>A</b>								
Selected: 1 Running: 0 Holding: 0 Queued: 0								
🌙 Maximum Running Jobs 🗌	4 ▲ ▼ Total Per	ding: 6 Running:	1 Queued	:5 Ho	lding: 0	Done: 140	Failed	1: 0

All of the jobs shown above in the Job Manager's Pending tabbed panel specify the same Project File for their output. The currently running job has placed a write lock on this output Project File; each of the remaining jobs needing to write to this file is blocked from running until all of the preceding jobs have completed. Queued jobs blocked by a file lock are indicated in the status field as *Blocked*. Hovering the mouse over the status field also reveals a DataTip that explains the lock status.

other jobs that do not require a file that is currently being written to by another job, the JPS will automatically skip the blocked jobs temporarily and run the next nonblocked jobs and thus proceed with concurrent processing up to the Maximum Running Jobs value.

You can avoid the JPS file contention issues outlined above by setting up jobs so that each one writes its output to a separate file. Tools and strategies for directing outputs to different files are discussed below for different types of TNTmips processes.

## Processes Making a Single Output Object (Single Job File)

Some TNTmips processes that support Job Processing produce a single output object from one input object (or a set of input objects). An example is Vector to Raster Conversion (Geometric / Convert / Vector to Raster), which has a number of data-specific process settings and thus allows you to select only one input object at a time. Pressing the Queue Job or Save Job button in this process creates a single job file that launches one job process utilizing that input/output pair of objects. Setting up a series of such jobs requires reselecting the input and output objects individually for each job. In order to ensure that you can achieve concurrent processing of a series of such jobs, you only need to take care to direct the output object for each job to a different Project File using the familiar file and object naming procedures that you use with any TNTmips process.

Kector to Raster Conversion	
Input Parameters	1
Input Vector cb_soils_rbs.rvc / CBSOILS	Vector to Raster Conversior
Points Lines Polygons	is an example of a process
Process: All - Value: All Same - 💋	that creates one output object. Each job file is
Output Parameters	created separately in the
Output Type 8-bit unsigned	process by selecting the
Cell Size Raster Size   Height: 27.178 Lines: 512   Hidth: 27.126 Columns 380	appropriate input and output objects and pressing the
Units: neters Units: neters	Queue Job or Save Job button.
Input Raster	
Run Queue Job Save Job	Exit Help

## Processes Making Multiple Output Objects (Multiple Job Files)

A number of TNTmips processes that support Job Processing can produce multiple output objects from one or more input objects. For example, Raster Extract (Image / Extract), Raster Resampling (Image / Resample and Reproject / Automatic), and Geometric Warping (Geometric / Reproject) allow you to select a number of input objects and create one output object for

(over)

Raster Extract	
Rasters Extract Map Extents Zoom	'Orient   Yalues   Insert   Special
L7_p202r039.rvc / Band1	📕 🧏 Geometric Warping via Georeference 📃 🗆 🔀
L7_p202r033.rvc / Band3 L7_p202r033.rvc / Band4 L7_p202r033.rvc / Band5 L7_p202r033.rvc / Band5	Alabana,rvc / Alabana Arkansas,rvc / Arkansas Connecticut.rvc / Connecticut
Select Renove Renove All	Select Renove All
Run Queue Job Save	Hodel Fron Georeference J Job. J Match source coordinate reference system
	Output Projection WGS84 / Geographic
Raster Extract and	The Densify Lines Accuracy 10.00 neters
Geometric Warping	Run Queue Job Save Job Exit Help
(above) are processes	

🕏 Topographic Properties 📃 🗌 🔯						
Raster HighSierra.rvc / HighSierra						
Surface-fitting m	ethod for 3*3 Wind	low				
Exact fit to 4 ne	arest neighbors ar	nd center ce	11 💌			
Output raster in	nformation					
🕱 Slope 🛛 😽 🖉	it unsigned intege	r 💌 Degree:	s 💌			
🕱 Aspect 16-	bit signed integer	•				
🕱 Shading 🛛 🛛 🗷	it unsigned intege	r 💌 Hethod	High-Contrast 💌			
🕱 Curvature   32-1	bit floating-point	💌 🗷 Profi	le 🗷 Plan Radians/Meter 💌			
Pyranid Average	Compression Sta	ndard Lossle	ss 🔽			
Paraneters			Sun Angle Calculator			
Horizontal Cell 9	Size	10.0 m	Latitude N 0 00 00.000 🚱			
Vertical Cell Siz	ze	10.0 m	Longitude E 0 00 00.000			
Scale for elevation 1.0000 Day			Day 1 Month 1 Year 1901			
Elevation angle of the sun 60.0 deg Hour 0 Minute 0 UTC						
Direction of the sun 300.0 deg Calculate						
Run	Queue Job	Save Job	Exit Help			

that allow selection of multiple input objects and produce one output object for each. The Topographic Properties process (right) is an example of a process that can create more than one output object from a single input object (a digital elevation model raster object). The Queue Job and Save Job buttons in these

processes automatically create a separate job file for each output object. These jobs can then run concurrently if each of these output objects is directed to a different Project File.

each input object. The Topographic Properties process (Terrain / Topographic Properties) lets you create various output products from a single input elevation raster. Pressing the Queue Job or Save Job button in any of these processes automatically creates a *separate* job file for each output object. These jobs can run concurrently if each of these output objects is directed to a different output Project File.

You can automatically create a separate Project File for each output object in such processes by using the Auto-Name button on the Select Objects dialog. You may have used this button to automatically name all of the new objects *after* you selected an output project file. However, this button is also available *before* you have selected and navigated into a particular Project

🛰 Select raster objects to extract to		_ 🗆 🔀	🖎 Select raster objects to extract to	
E: (Data) - temp - JobProcessing -		• <b>MA@</b> !!!	E (Data) - temp - JobProcessing -	• 🕅 🎗 🕅 •
Name (10 files) 🔺	Modified Size Type		Name (10 files) .	Modified Size Type
FrenchmanSAS, rvc	2014-02-20 8,19 KB TNT Project		FrenchmanSAS, rvc	2014-02-20 8,19 KB TNT Project
GassPeakSAS.rvc	2014-02-20 8,19 KB TNT Project		🖬 GassPeakSAS.rvc	2014-02-20 8,19 KB TNT Project
HendersonSAS, rvc	2014-02-20 8,19 KB TNT Project		HendersonSAS.rvc	2014-02-20 8,19 KB TNT Project
HighSierraNAD83.rvc	2014-02-20 8,19 KB TNT Project		HighSierraNAD83,rvc	2014-02-20 8,19 KB TNT Project
ME_BedrockGeologyGeo.rvc	2014-02-20 8,19 KB TNT Project		ME_BedrockGeologyGeo.rvc	2014-02-20 8,19 KB TNT Project
RasterExtract.rvc	2014-02-24 109 MB TNT Project		RasterExtract.rvc	2014-02-24 109 MB TNT Project
Slope,rvc	2014-02-21 8,19 KB TNT Project		Slope,rvc	2014-02-21 8,19 KB TNT Project
ValleySAS.rvc	2014-02-20 8,19 KB TNT Project		ValleySAS.rvc	2014-02-20 8,19 KB TNT Project
N			A	
Files 💭 All 🗇 rvc Objects All 📃	🗏 Question	_ = 🛛	Files ] All 🗇 rvc Objects All 🗾	
Selected	Each object will be created in a separa	te project file.	Selected	
Object Name Description	Files will be created immediately, with	same name as object.	Object Name Description	Location
Band1 [skip - click to assign]	-	OK Cancel	Band1 Band1 p202r039_7t20010410_z29_nn10	E:\temp\JobProcessing\Band1.rvc
Band2 [skip - click to assign]			Band2 Band2 p202r039_7t20010410_z29_nn20	E:\temp\JobProcessing\Band2.rvc
Band3 [skip - click to assign]			Band3 Band3 p202r039_7t20010410_z29_nn30	E:\temp\JobProcessing\Band3.rvc
Band4 [skip - click to assign]			Band4 Band4 p202r039_7t20010410_z29_nn40	E:\temp\JobProcessing\Band4.rvc
Band5 Iskip - click to assign]			Band5 Band5 p202r039_7t20010410_z29_nn50	E:\temp\JobProcessing\Bandb.rvc
N			N	
New Folder	Space free: 748 GB T	emporary: 231 GB	New Folder	Space free: 748 GB Temporary: 231 GB
New File Name			New File Name	
Description			Description	
	Auto-Name Create File	OK Cancel		Ruto-Name Create File OK Cancel

Select Objects dialog for designating the output rasters for the Raster Extract process window shown at the top left of this page, opened using the Queue Job or Save Job button. Pressing the Auto-Name button while at the file level of navigation (above left) immediately creates a separate new Project File for each output object. The name of each input object is used to name its output Project File and object (result above right).

File. Used at the file level of navigation, it creates a separate new Project File for each output object. The input object name is used to name the corresponding output Project File and output object. (If any of these file names is already in use within the selected directory, you are prompted to choose a different output directory).

😽 Job Manager							_ 🗆 🛛
Pending Done	Failed	Scheduled Setting	:				
Select All	Tasks r	not running Queue	Hold Delete Run Now	Schedule Job	🖳 🖆 🛃 🔤	Tasks running Pause	Resume Cancel
Status 🔺	Priority	ID	Nane	Proc	ess ID   Run T.	ime Progress	
🖃 Running	10	20140224_114951_01	Raster Extract	(6/6)	17		
Running	10	20140224_114951_02	L7_p202r039.rvc / Band1	2472	17		- 11
Running	10	20140224_114951_03	L7_p202r039.rvc / Band2	1152	17		
Running	10	20140224_114951_04	L7_p202r039.rvc / Band3	3356	17		
Running	10	20140224_114951_05	L7_p202r039.rvc / Band4	3484	17		
Queue	10	20140224_114951_06	L7_p202r039.rvc / Band5				
Queue	10	20140224_114951_07	L7_p202r039.rvc / Band7				
Job Manager showing four of the Raster Extract jobs created above running concurrently with their results writing to different Project Files.							
Selected; 1 Running; 0 Holding; 0 Queued; 0							
Maximum Runi	ning Jobs	4 ▲ ▼ Total Pe	nding: 6 Running: 4	Queued: 2	Holding:	0 Done: 146	Failed: 0