NEWSLETTER NEWSLETTER NEWSLETTER NEWSLETTER

AAG REMOTE SENSING SPECIALTY GROUP

Issue Number 2 December 1980

NSF REMOTE SENSING GRANT

This issue of the newsletter is being sent out principally to alert the RSSG membership to the possibilities of an RSSG coordinated NSF grant to fund individual research (see attached letter from Nevin A. Bryant to Robert K. Holz). The researchers will make use of a set of NASA-JPL imagery (see attached description by Jerry Clark) and the JPL image processing facilities.

The funding requested can be in the $8-12,000 range; added weight will be given to those researchers that are able to generate some local funds, but the quality of the proposal will be the most critical determining factor. Funding may include summer salary, travel to JPL and some living expenses while working there and miscellaneous fees that are needed to reproduce the written report. There is some urgency to this mailing; we would like to submit the package of proposals for the NSF spring proposal granting period. Individual proposals should be sent to:

Robert K. Holz, Chairperson RSSG
Department of Geography
The University of Texas at Austin
Austin, Texas 78712 Phone: 512/471-5116

Proposals should be submitted as soon as possible and no later than Feb 1, 1981.

DUES

The Remote Sensing Specialty Group is currently operating in the red. A single mailing of the RSSG Newsletter costs about $80.00; the 1980 rebate obtained from the AAG for group members came to $80.50. This mailing of the newsletter will create a negative balance of about $95.00. The Executive Committee of the RSSG has decided to levy a $5.00 dues payable at the beginning of the calendar year. The $5.00 will provide a reasonable operating budget for the RSSG and will encourage membership by only those truly interested in the group's activities. Dues should be paid now for the 1981 year. Checks payable to RSSG should be sent to;

J. Ronald Eyton, Secretary-Treasurer RSSG
Department of Geography
University of South Carolina
Columbia, SC 29208

CALL FOR PAPERS

The Purdue University Laboratory for Application of Remote Sensing has asked that we remind members of the RSSG about the Seventh Symposium on Machine Processing of Remotely Sensed Data to be held June 23-26, 1981. The emphasis of this symposium will be placed on forest, range and wet land assessment. Summaries of papers (500-1000 words in quadruplicate) are due by February 13, 1981 and should be sent to:

Douglas B. Morrison
Purdue University/LARS
1220 Potter Drive
West Lafayette, Indiana 47906
(317) 749-2052

FOR YOUR INFORMATION

The specialty groups have been listed below according to the size of the membership. The Remote Sensing Specialty Group is the 8th largest of the groups according to the March 1980 figure shown here.

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JET PROPULSION LABORATORY *California Institute of Technology • 4800 Oak Grove Drive, Pasadena, California 91103*

November 24, 1980

Refer to: 384-ER/NAB:iw-80-322

Dr. Robert K. Holz
Department of Geography
The University of Texas at Austin
Austin, Texas 78712

Dear Bob:

Enclosed with this letter is a summary of the digital data sets to be made available for researchers by next June. These data sets consist of remotely sensed imagery extending from the UV through L Band radar, digital terrain data having a resolution sufficient to simulate backscatter properties and analyze slope aspect effects, and a Level III land use classification. Sufficient coverage exists for researchers to analyze all types of urban land cover from the CBD to the urban fringe, to study the chaparral and grasslands environment of southern California, and undertake geological and geomorphologic studies of portions of the Santa Monica, San Gabriel, and Sata Susana mountains.

As we confirmed in our teleconference together with Barry Moriarity, should the researchers be funded for travel arrangements, our personnel and facilities will be available for their use. In the interest of efficiency, we would like to reserve the right to schedule their visits on a non-interference basis with our other research tasks and the August 1981 Voyager 2 encounter with Saturn. Furthermore, we would encourage researchers to undertake as much image processing as possible at their own facility prior to coming to JPL so that they could maximize their time by using our image display devices for data product reviewing rather than spend all of their time at interactive analysis. Scheduling is also needed, because we can only expect to have one of our image processing analysts available to assist in job submission and interactive display operation.

I am looking forward to the opportunity that this activity will present to both us at JPL and the geography research community. I hope the previous paragraphs and enclosed data set description have been explicit enough for you to place an announcement in the AAG Newsletter. If there are any further questions at this time, please contact me at (213) 354-7236. If it is satisfactory with you, I suggest we contact each other in January about drafting the proposal to NSF.

Sincerely yours,

Nevin A. Bryant

Enclosures

REMOTE SENSING DIGITAL DATA SETS OF THE LOS ANGELES REGION AVAILABLE FOR RESEARCHERS

Prepared by

Jerry Clark
Earth Resources Applications Group
Image Processing Laboratory
Jet Propulsion Laboratory
Pasadena, California

In June, 1981, several data types, including remotely-sensed imagery and cartographic data, will be spatially reprojected to match a common map base with a Universal Transverse Mercator (UTM) projection. The resultant reprojected aircraft radar and multispectral scanner imagery, digital terrain files, and land use maps will be available as data sets that have areal coverage corresponding to USGS 7 1/2 minute topographic quadrangle maps in the Los Angeles Basin. A common map base, or planimetric base, will be used because a common map projection minimizes the unique projection differences between imaging sensors and cartographic files by realigning resolution cells to approximate the UTM mathematical map projection.

The data sets will be spatially nested, that is, they will be spatially reprojected to the same map base but will have differing resolutions with the result that each resolution can be matched with simple spatial aggregations or expansions. Therefore, the nested data sets of 15 meter resolution cells can be matched with 30 meter resolution nested data sets when four 15 meter resolution cells in a 2 x 2 matrix are aggregated to form one 30 meter resolution cell. Conversely, one 30 meter resolution cell can be replicated to form a 2 x 2 matrix of 15 meter cells. This system of nested data sets having different resolutions allows flexibility in manipulating the data sets: either they can be used at their full, reprojected resolution and compared with other data sets of the same resolution, or they can be altered by aggregating or expanding them to match other resolutions levels.

There will be six data types of imagery and cartographic information spatially reprojected to match the common UTM map base: aircraft synthetic aperture radar (SAR) imagery, Dadaelus Multispectral Scanner imagery, Thematic Mapper Simulator (the NS001 multispectral scanner) imagery, Gestalt Photo Mapper digital terrain models (DTM), Digital Land Mass Simulator (or Arc-Second) DTM's, and the ESRI (Environmental Sciences Research Institute) land use files for Los Angeles. The imagery have a number of sensors that sample the earth in specific wavelengths. Both the imagery and cartographic data sets have inherent resolutions that will be changed somewhat during the reprojection process to optimize comparisons between data sets. These data type characteristics are tabularly summarized in Table 1.

The aircraft SAR will be available in L-band and X-band, both in like-polarized (HH) and in cross-polarized (HV). The L-band sensor wavelength is about 23 cm. The inherent resolution of the L-band imagery is 17 to 19 meters per resolution cell, or picture element, but the reprojected resolution, after the imagery has been processed to match the UTM projection, is 15 meters. Jet Propulsion Laboratory (JPL) flew the L-band sensor on the NASA Convair 990 aircraft at 33,000 feet altitude (with a due north look direction and depression angles varying from

42° near range to 14° far range) over Los Angeles, March 7, 1979.

The X-band sensor has a wavelength of 3.2 cm with a 12 to 14 meter resolution. The reprojected resolution is 15 meters. Johnson Space Center (JSC) flew the X-band sensor on a RB-57 aircraft at 60,000 feet altitude, with a due north look direction and depression angles varying from 49° near range to 30° far range, over Los Angeles during the period August 30 to September 2, 1979.

The Dadaelus Multispectral Scanner (DMS), flown by Ames Research Center on a U-2 aircraft at 65,000 feet altitude over Los Angeles, April 18, 1980, provides 11 channels of image data in the wavelength range of ultraviolet to thermal infrared (see Figure 1 for specific ranges). The inherent resolution of 80 feet is reprojected to 30 meters.

The NS001 Multispectral Scanner, functioning as the Thematic Mapper Simulator (TMS), has eight channels in the ultraviolet to thermal infrared range (see Figure 1). Its inherent resolution of 10 to 15 meters is reprojected to 15 meters, similar to the aircraft SAR. It was flown in a C-130 at 20,000 feet altitude over Los Angeles on July 12, 1980, by Johnson Space Center.

The Gestalt Photo Mapper (GPM) digital terrain models (DTM) provide elevation data in one meter increments for 30 meter resolution cells. The GPM is used by the USGS to scan air photo stereographic pairs to create stereomodels that are further processed to provide elevations at 30 meter x, y increments within the area of standard USGS 7 1/2 minute topographic quadrangle maps at a UTM projection. These digital terrain models, sensitive to one meter variations in terrain, are distributed by the NCIC (National Cartographic Information Center) of the USGS. The 30 meter inherent resolution does not have to be reprojected because the GPM DTM's are already in the UTM projection used as the map base for the imagery and other cartographic data. Its 30 meter resolution is similar to the 30 meter reprojected Dadaelus multispectral imagery.

The Digital Land Mass Simulator (DLMS) is another type of DTM distributed by NCIC of the USGS. Each DLMS covers an area one degree square with resolution cells that are measured in arc-seconds, not meters. One cell is three arc-seconds square with sides of about 70 to 80 meters depending on latitude. The DLM's are reprojected to UTM and the resolution cells standardized to 90 meters, therefore, a 3 x 3 matrix of aggregated GPM cells or a 6 x 6 matrix of aggregated aircraft SAR cells would match the resolution of one DLMS cell.

Finally, the ESRI (Environmental Science Research Institute of Redlands, California) land use files provide coordinate points demarking the boundaries of land use within the area of standard USGS 7 1/2 minute topographic quadrangle maps. The coordinate data, which are converted to the UTM projection coordinates of the map base, and their land use identifiers are made into images with 7.5 meter resolution. A 2 x 2 matrix of these cells, when aggregated, will match the resolution of the Thematic Mapper Simulator.

The availability of the reprojected imagery and cartographic data is summarized in Table 2. The percentage of map control point coverage within quads (noted in Table 2 and delineated in Figure 1) indicates that image data within the limits of control point coverage are reliably reprojected to the map base; conversely, image data outside the limits of control point coverage are not reliably reprojected to the map base. Data availability for each data type, by quad, is delineated in Figures 2 through 6. The ESRI land use classification scheme is listed in Table 3.

An Xerox copy of Table 2, figures 1-6, and Table 3 (10 pages) can be obtained by requesting a copy from

J. Ronald Eyton, Secretary-Treasurer RSSG
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Data Type	Sensor	Wavelength	Inherent Resolution	Reprojected Resolution	Date	Source
Aircraft SAR	L(HH)	23cm	17-19m	15m	07 March 1979	JPL
	L(HV)	23cm	17-19m	15m	07 March 1979	JPL
	X(HH)	3.2cm	12-14m	15m	30 Aug-02 Sep 1979	JSC
	X(HV)	3.2cm	12-14m	15m	30 Aug-02 Sep 1979	JSC
Dadaelus Multispectral Scanner	Channel 1	.38- .42μm	80 ft	30m	18 April 1980	Ames
	2	.42- .45μm	80 ft	30m	18 April 1980	Ames
	3	.45- .50μm	80 ft	30m	18 April 1980	Ames
	4	.50- .55μm	80 ft	30m	18 April 1980	Ames
	5	.55- .60μm	80 ft	30m	18 April 1980	Ames
	6	.60- .65μm	80 ft	30m	18 April 1980	Ames
	7	.65- .69μm	80 ft	30m	18 April 1980	Ames
	8	.70- .79μm	80 ft	30m	18 April 1980	Ames
	9	.80- .89μm	80 ft	30m	18 April 1980	Ames
	10	.90- 1.10μm	80 ft	30m	18 April 1980	Ames
	11	10.4 -12.5 μm	80 ft	30m	18 April 1980	Ames
NS001 Multispectral Scanner (Thematic Mapper Simulator)	Channel 1	.45- .52μm	10-15m	15m	12 July 1980	JSC
	2	.52- .60μm	10-15m	15m	12 July 1980	JSC
	3	.63- .69μm	10-15m	15m	12 July 1980	JSC
	4	.76- .90μm	10-15m	15m	12 July 1980	JSC
	5	1.00- 1.30μm	10-15m	15m	12 July 1980	JSC
	6	1.55- 1.75μm	10-15m	15m	12 July 1980	JSC
	7	2.08- 2.35μm	10-15m	15m	12 July 1980	JSC
	8	10.4 -12.5 μm	10-15m	15m	12 July 1980	JSC
Gestalt Photo Mapper (Digital Terrain Model)	-	-	30m	30m	-	USGS
Digital Land Mass Simulator (Digital Terrain Model)	-	-	70-80m	90m	-	USGS
ESRI Land Use Files	-	-	(coordinate data)	7.5m	-	ESRI

Table 1. Data Type Characteristics