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MACHINE PROCESSING OF REMOTELY SENSED

DATA FOR CHANGE DETECTION

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THE SOUTH DAKOTA LAND USE

INVENTORY SYSTEM

J

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ABSTRACT

Remote sensing can furnish a quanti-
tative method for detecting change in
earth surface features. LANDSAT-1 MSS
data was temporally overlayed and geomet-
rically corrected.. Data from one date
was then classified and a LARSYS results
tape produced. Data from the second date
was then similarly processed. Classifi-
cations for the same geographical area
were then available for two (or more)
dates. These classifications were then
compared on a point by point basis by the
computer to determine the type and loca-
tion of changes occurring for the inter-
vening period between data sets.

Two applications of this post-classi-
fication change detection technique were
made. The first was used to study fluc-
tuations of the snowpack in the Rocky
Mountains of Colorado. The purpose of
this application was to accurately deter-
mine the rate of diminution of the snow
pack and thus provide information for
predicting flow rates. The second appli-
cation was to study land use changes in
Marion County, Indiana to provide informa-
tion to land use planners.

ABSTRACT

All levels of government share the
need for natural resource information.
Remote Sensing and computer technology can
provide a cost effective means of col-
lecting, analyzing, and synthesizing some
of this data.

One of the principal areas where re-
motely sensed data is being applied in
governmental natural resource planning is
in the generation of land use, or more
precisely, land cover information. The
South Dakota State Planning Bureau, with
assistance and technical support from the
EROS Data Center, is implementing a Land
Use and Natural Resource Inventory and
Information System. A three phase program
has been designed utilizing LANDSAT digi-
tal data and high altitude photography as
the primary data sources for a statewide
inventory.

The LANDSAT Imagery Analysis Package,
developed over the last two years by the
author, is being used for digital data
analysis and display. This program system
has many capabilities: Combination and
reformating of single or consecutive
scenes; display of grey tone maps of raw
data; linear rectification of areas of up
to three million pixels; selection and
editing of training fields; two or four
band clustering for single season or tem-
poral data; Gaussian Maximum Likelihood
classification for four band data; table
lookup classification for two band data;
combination of categories and aggregation
of data in up to forty acre cells; genera-
tion of color coded or grey tone land use
maps of categorized data at scales ranging
from 1:24,000 to 1:500,000; and storage
and retrieval of categorized data on a
county, municipal, or township basis.