

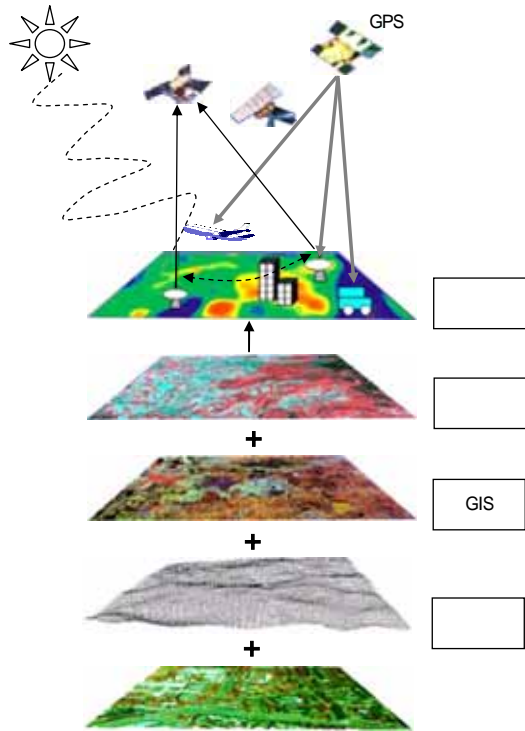
Trend of Multi-sensor Spatial Imagery Processing Technology

<p>& RFID/USN</p>	<p>(K.O. Kim) (S.W. Shin) (Y.J. Lim) (H.G. Kim) (J.H. Oh)</p>
<p>.....</p>	

가
가
가
3 가 , , ,
가
가
가

I.

가
(LiDAR,
Hyperspectral, SAR - “
”)
가
가



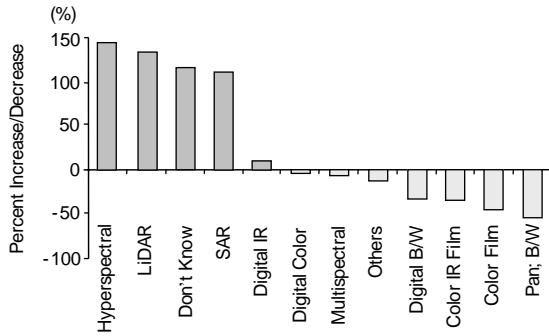
(1)

-
-
- (resolution merging):
- DEM : 3-D
-
- 3
- LiDAR : ,
- LiDAR
- (hyperspectral)

, GIS
, 3
, / ,
, (1)
ETRI

(), (SAR),
(LiDAR, GPS/INS)

1.
(2) ASPRS
가 가
3 hyperspectral, LiDAR



< >: ASPRS, 2003.
(2)

2.

SAR (multispectral)

hyperspectral 가
가
(panchromatic)
가
LiDAR 가 LiDAR
cm
가
LiDAR

fusion)

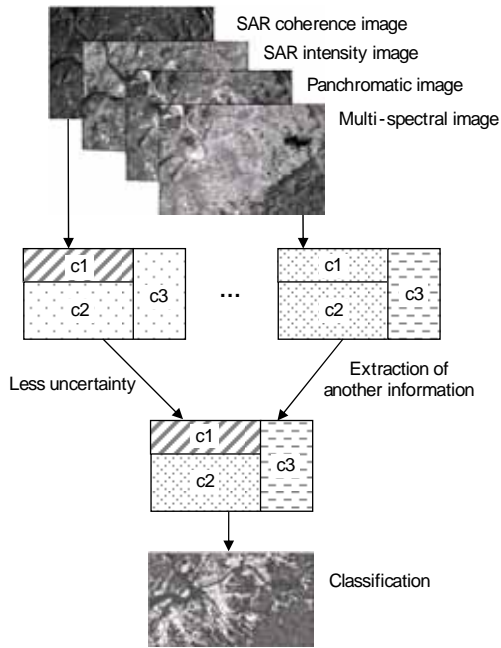
(data, 1980
가
GIS
data integration,
data fusion, data merging, data assimilation

Hyperspectral LiDAR 가
가 가
SAR , SAR
가 가 (decision), (modeling)
가
가 (pixel), (feature),

Interferometry SAR(InSAR) SAR
(PolSAR) SAR
SAR
가

/

가 , IF-Then
 (contextual in-
 formation)
 가 , SAR
 가 speckle
 가 EM
 eCognition
 1.
 가
 가 (spatial resolution)
 가
 Markov random field
 가
 [1].
 가 SPOT 10m
 20m
 가
 가
 (Fuzzy) , (3)
 1990



(3)

가?” (spectral resolution)

-
-
-
-

(imaging geometry) (temporal resolution)

가 (fusion level)

가 가

가

(common spatial

가

reference)가

-
-

가가 가?

가?

가

(resampling) (co-registration)

-

가?

가

가 가

-
-

가? 가 가

, 가

가

“ 가

가.

(extent), (shape)
(neighborhood)

가

[2].

- (pixel)
 - (feature)
 - (decision)
- (feature ex- traction)

(4)

(segmentation)
(raster)

(classification)

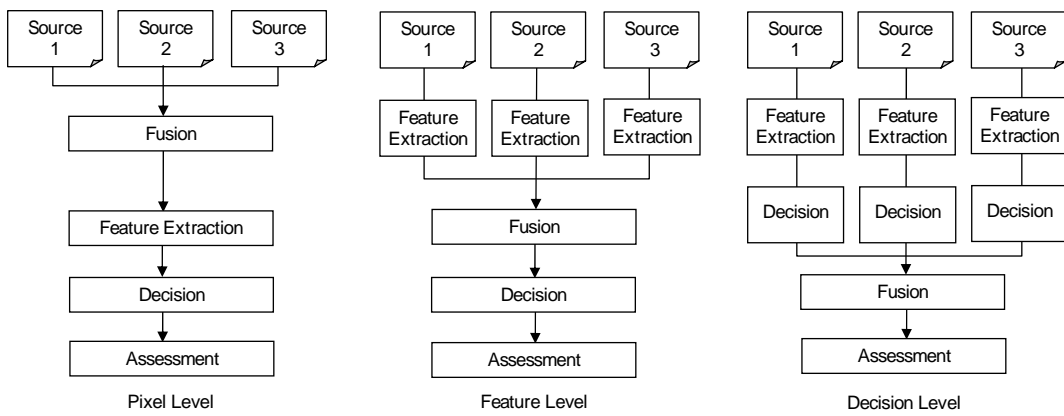
가

가

(reprojection) 1) , 2)
(geocoding) , 3)

(segmentation proce-

dure)



(4)

[6].

3)

가

가

가

VIR/VIR , (incidence angle)
가 SAR/SAR VIR/SAR

[3],[4].

(pair)

(radiometric)

[6]-[8].

1)

4)

가

가 [9].

HIS

VIR/VIR

[3].

가

[5]. [5]

가

가

가

5)

2)

(registration)

VIR(가 /)

. VIR

(image-to-map)

가

(surface roughness)

가

(artificial neural network)

6)

가.

LiDAR

, SAR

가

가

LiDAR

가

(SAR

[10].

가

7)

(missing observation)

(carrier frequency)

. VIR

SAR
geometry)

(side-looking

. (5) LiDAR

resolution approach)

(optimal
[11].

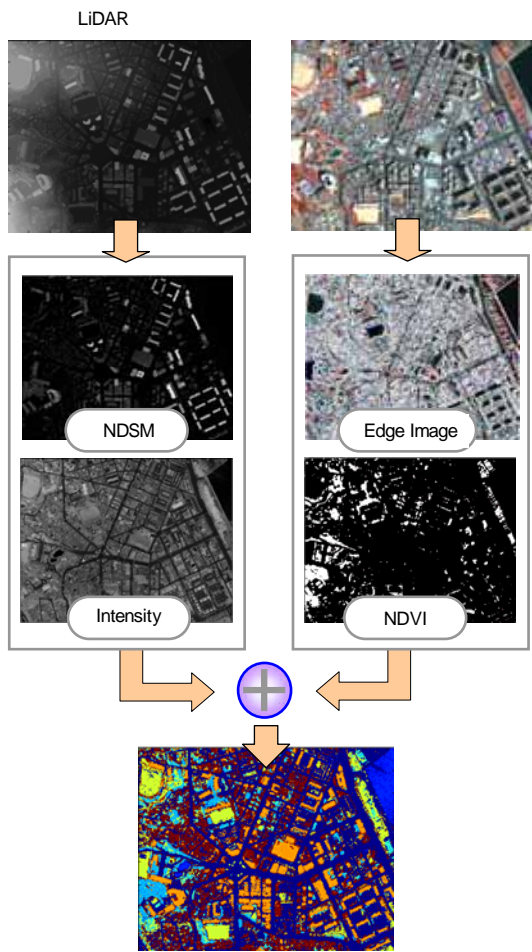
()

2.

가

SAR

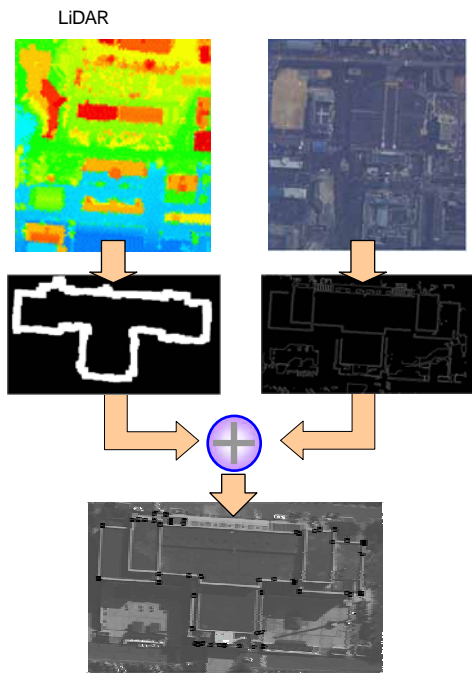
hyperspectral



(5) LiDAR

가
NDVI()
가
가
가
LiDAR
SAR, hyperspectral
LiDAR

가
가
2 가
가
(footprint)
LiDAR GIS
가
(水高)
GIS
GIS
(6)
LiDAR



(6) LiDAR

가 ,

LiDAR 가

break-line

LiDAR

hyperspectral

DEM

가

LiDAR DSM

DEM

imaging sensor non-imaging sensor

가

. Direct-Georeferencing

, GPS/INS

LiDAR, SAR,

DEM

, LiDAR

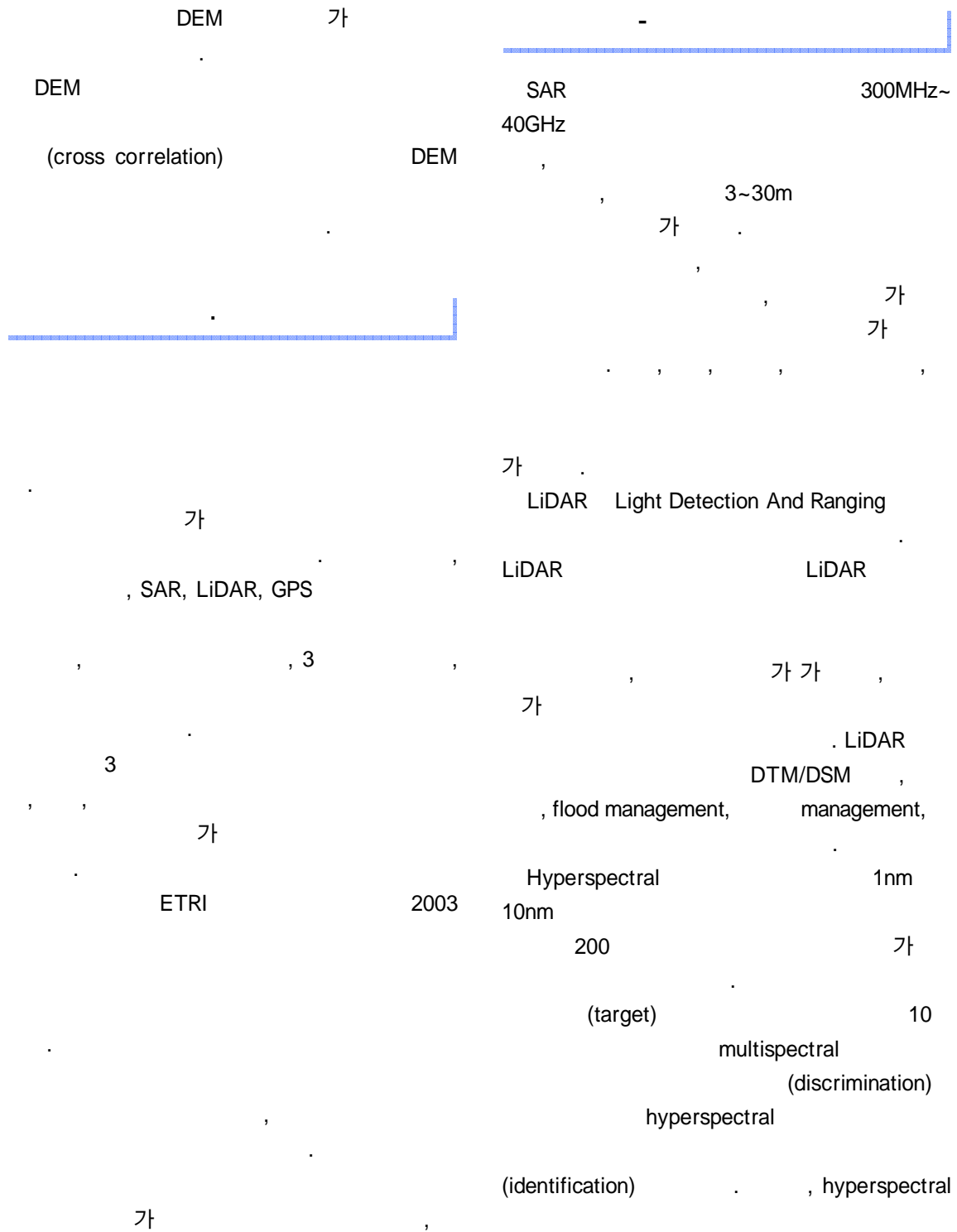
가

가

InSAR



20 3 2005 6



ASPRS	American Society of Photogrammetry and Remote Sensing
DEM	Digital Elevation Model
DSM	Digital Surface Model
DTM	Digital Terrain Model
GIS	Geographic Information System
GPS	Global Positioning System
HIS	Hue-Intensity-Saturation
INS	Inertial Navigation System
NDSM	Normalized Digital Surface Model
NDVI	Normalized Difference Vegetation Index
SAR	Synthetic Aperture Radar
VIR	Visual/Infrared

- [1] Anne H. Schistad Solberg et al., "A Markov Random Field Model for Classification of Multisource Satellite Imagery," *IEEE Trans. Geoscience and Remote Sensing*, Vol.34, No.1, Jan. 1996, pp.100–113.
- [2] C. Pohl and J.L. Van Genderen, "Multisensor Image Fusion in Remote Sensing," *INT. J. Remote Sensing*, Vol.19, No.5, 1998, pp.823–854.
- [3] L.D. Keys, N.J. Schmidt, and B.E. Phillips, "A Prototype Example of Sensor Fusion Used for a Siting Analysis," Technical Papers, ACSM-ASPRS Annual Convention, Image Processing and Remote Sensing, 1990, pp.238–249.
- [4] R.H. Rogers and L. Wood, "The History and Status of Merging Multiple Sensor Data," Technical Papers, ACSM-ASPRS Annual Convention, Image Processing and Remote Sensing, 1990, pp.352–360.
- [5] T. Ranchin, L. Wald, and M. Mangolini, "The ARSIS Method: a General Solution for Improving Spatial Resolution of Images by the Means of Sensor Fusion," *Proc. EARSeL Conf.*, Cannes, France, Feb. 1996, pp.6–8.
- [6] R. Welch, T.R. Jordon, and J.C. Luvall, "Geocoding and Stereo Display of Tropical Forest Multisensor Data Sets," *Photogrammetric Engineering and Remote Sensing*, Vol.56, 1990, pp.1389–1392.
- [7] D. Strobl, J. Raggam, and M.F. Buchroithner, "Terrain Correction Geocoding of a Multisensor Image Data Set," *Proc. 10th EARSeL Symp.*, Toulouse, France, 1990, pp.98–107.
- [8] T. Toutin and B. Rivard, "A New Tool for Depth Perception of Multi-source Data," *Photogrammetric Engineering and Remote Sensing*, Vol.61, 1995, pp.1209–1211.
- [9] S.E. Franklin and C.F. Blodgett, "An Example of Satellite Multisensor Data Fusion," *Computers and Geoscience*, Vol.19, 1993, pp.557–583.
- [10] D.A. Mouat, G.G. Mahin, and J. Lancaster, "Remote Sensing Techniques in the Analysis of Change Detection," *Geocarto International*, Vol.2, pp.39–50.
- [11] H. Haefner, F. Holecz, E. Meier, D. Nuesch, and J. Piesbergen, "Capabilities and Limitations of ERS-1 SAR Data for Snowcover Determination in Mountainous Regions," *Space at the Service of our Environment, Proc. of the Second ERS-1 Symp.*, Hamburg, Germany, Oct. 1993, pp.971–976.