# CASA — Cloud And cloud Shadow Assessment Software

GDA Corp.

Cloud and cloud shadow contamination remains a remote sensing industry-wide problem with generally unsatisfactory solutions to date. GDA Corp. offers fully automated, operational-grade software for accurate detection of clouds and cloud shadows and statistical assessment of cloud / shadow contamination of the scene or a specific AOI.
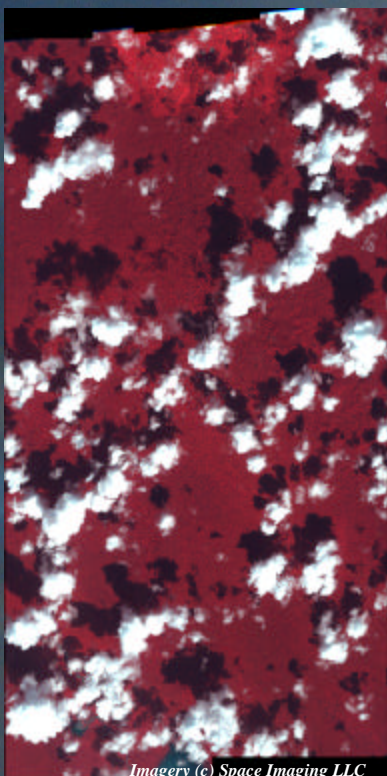
Imagery (c) Space Imaging LLC
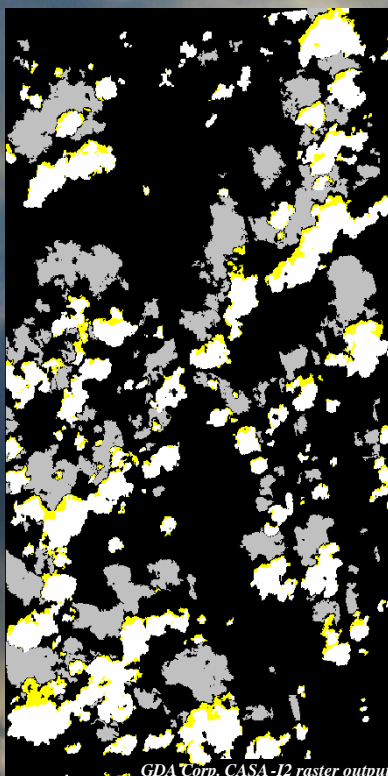
GDA Corp. CASA-I2 raster output

Coverage report for
c:\casa\po_187902_0000000_casa_result.tif (%):

Total cloud cover: 16.12
Total haze cover: 3.36
Total shadow cover: 14.52

UL cloud cover: 14.86
UL haze cover: 3.12
UL shadow cover: 14.86
UR cloud cover: 15.39
UR haze cover: 3.03
UR shadow cover: 14.12
LL cloud cover: 19.51
LL haze cover: 4.42
LL shadow cover: 16.22
LR cloud cover: 12.77
LR haze cover: 2.32
LR shadow cover: 9.19
Size of processed image (pixels): 21658065
Total processing time: 410 seconds
Cloud cover quality estimate: Good
CASA result warnings: None

- ☐ Total Cloud Cover
- ☐ Total Light Cloud / Haze Cover
- ☐ Total Cloud Shadow Cover

CASA Overview:

❑ CASA relies on spectral (VNIR), spatial, and pattern information present in the image, and hierarchical, iterative self-learning logic.

❑ CASA provides a fully automated, per-pixel detection of dense clouds, light clouds / haze, and cloud shadows.

❑ CASA is a stand-alone, platform-independent C++ program that can be run on Windows, Linux, and UNIX.

❑ CASA is designed for operational, near-real time processing of large volumes of imagery. It can be used at the ground station or onboard the satellite via FPGA.

❑ CASA has been validated on 216 Ikonos scenes, including 74 scenes that were chosen for CASA validation by GeoEye.

CASA is within 10% of the truth cloud estimate for more than 90% of all images tested

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CASA Input:
❑ CASA requires georeferenced, 11-bit Ikonos imagery and image metadata as input.
❑ The current version works with GeoTIFF and ERDAS Imagine HFA image formats. Other formats, including NITF, can be incorporated.

CASA Outputs:
❑ A raster mask presenting per pixel cloud and cloud shadow contamination of the scene/AOI. Different IDs are assigned to dense clouds, light clouds / haze, and cloud shadows.
❑ A text file with scene total and per quad % cloud and cloud shadow contamination and an accuracy measure of cloud detection. Or, cloud and cloud shadow contamination can be provided for any AOI.
❑ Additional spatial outputs can be requested to aid in editing CASA cloud / cloud shadow masks when increased per pixel accuracy is desired, including: (i) a raster output depicting different cloud categories, (ii) raster outputs providing IDs for each individual cloud, separately for each cloud category, (iii) a raster output providing IDs for each individual cloud shadow, and (iv) a raster output with each cloud and/or cloud shadow being enlarged to a user-specified number of pixels/meters.

CASA Benefits and Applications:
❑ Reduction in labor and operating costs—CASA will either significantly reduce, or entirely eliminate, the need for manual assessment of cloud contamination.
❑ Per-pixel location of clouds and cloud shadows for 100% of collected imagery. Data can be archived for fast reference/query at a later date.
❑ Simplified generation of value-added products such as image mosaics / composites—Automatically replace cloud areas with imagery from other sources.
❑ Operational identification of "failed" acquisitions (esp. with CASA FPGA implementation) for refined retasking.
❑ Per-pixel quality enables selling the cloud and shadow masks as a separate layer.
❑ Quality assurance tag for each image processed to allow for easy and fast filtering of data that may require eyes-on. Batch runs of CASA provide an output database that attaches a reliability rating to each image assessed.

Request a copy of the formal CASA validation white paper today

Contact us about CASA licensing. CASA is licensed by hardware key in a range of configurations to exactly suit your needs

Error Level	Percent of Scenes		
	Dense Cloud Cover	Light Cloud / Haze Cover	Total Cloud / Haze Cover
0 to 1%	46%	63%	41%
0 to 2%	62%	76%	52%
0 to 5%	83%	85%	74%
0 to 10%	92%	89%	82%
0 to 15%	95%	93%	87%
0 to 25%	98%	96%	95%
Max Error	58%	43%	57%