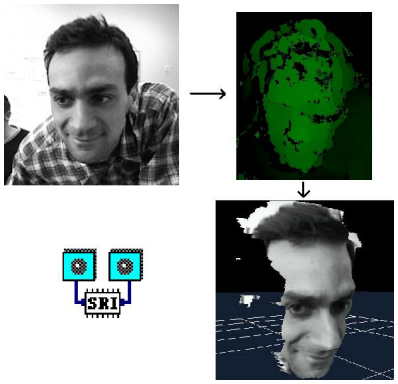
SVS



SRI International's Small Vision System is an accessible Developer Kit for **stereo applications** with libraries to **calibrate** a stereo head, **rectify** the images to account for distortion, **perform stereo correlation** to compute a range image, and **display** the range image in OpenGL 3D form. These algorithms are **3 to 4 times faster** than similar algorithms, and have high-quality filtering to reject false stereo matches.

SVS™ can be used with any Videre Design stereo head or on images available in the computer memory, under MS Windows and Linux.

SVS™ is the most efficient, high-quality stereo range software available for standard or embedded PCs.

SVS Features

- **SVS™ is a set of algorithms implemented as a software library with routines for:**
  - **Calibrating stereo heads using a simple planar target**
  - **Capturing video streams using standard frame grabbers**
  - **Computing dense stereo range images at video rates**
  - **Displaying video images and range information**
- **Real-time capable: 320x240, 32 disparities at frame rates (30 Hz) with a PIII 700 MHz**
- **Excellent range resolution and accuracy: Range interpolated to 1/16 pixel. Texture and consistency filters remove unreliable results**
- **Simple, fast, and accurate stereo head calibration using a printable planar target**
- **Easy-to-use C++ library API for MS Windows or Linux. Cross-platform display with the FLTK GUI and OpenGL 3D windows let you display results immediately**
- **Interface to MatLab for further analysis**
- **Interface to XVision2 for real-time segmentation and tracking in video images**
- **Bundled with Videre Design digital stereo heads**
- **Available as a separate software system to use with stereo images in host computer memory**

SVS™ software under license from SRI International®

SVS Kit Contents

- Calibration software tool
- Stereo processing libraries
- Driver and capture application software for the MDCS line of stereo cameras
- Interface to MatLab
- Application and display software (sources included)
- Software Manual (download from videredesign.com)

SVS System Configuration

- Pentium-compatible PC (Pentium MMX, AMD K6-2 or better) running MS Windows 2000/XP/Vista* with VC++ 6 or VNET++ 2003, or Linux 2.4/2.6. For MDCS cameras, the interface uses SSE instructions. These instructions are available in PIII-type processors, including AMD K7 processors and VIA Eden processors.
- Videre Design stereo camera head or stereo images in host computer memory
- Digital frame grabber for acquiring live image from a stereo camera

* Compatible with all new cameras after 12/01/08. Not compatible with earlier cameras.

SVS Specifications

General	Two-image stereo computation Arbitrary frame sizes Area correlation algorithm Video-rate implementation at up to 320x240 frames on standard PCs
Calibration	Calibration routines by presentation of a simple planar target Internal parameters - radial and tangential distortion, lens decentering, focal length, pixel aspect ratio External registration - baseline, orientation of each camera Based on Tsai's algorithms [Tsai 1991]
Rectification	Bilinear interpolation using the calibration parameters
Disparity Computation	Laplacian of Gaussian image filter Correlation: sum of absolute differences over a square window Correlation window sides from 5 to 21 pixels Disparity search from 8 to 128 pixels Subpixel interpolation to 1/16 pixel
Post-filtering	Low-texture confidence check Uniqueness check
3-D Reconstruction	Transform routines to generate 3D points from image point and disparity

SVS Benefits

- **Efficient** - SRI International's patent-pending algorithms are the most efficient ones available -- up to 6 times faster than competing solutions. Real-time capable: 320x240, 32 disparities at frame rates (30 Hz) with a PIII 700 MHz
- **Accurate** - Excellent range resolution and accuracy, using imagery from Videre Design cameras. Range is interpolated to 1/16 pixel, and texture and consistency filters remove unreliable results.
- **Flexible** - Simple, fast, accurate stereo head calibration using a printable planar target. You can change lenses, change baseline, even verge your cameras, and still calibrate them accurately. Lens distortion, all internal camera parameters, and external camera parameters are computed.
- **Convenient** - Easy-to-use C++ library API for MS Windows or Linux makes programming applications simple. Cross-platform display with the FLTK GUI and OpenGL 3D windows let you display results immediately.
- **Extensible** - SVS™ has an interface to MatLab, so stereo images and disparity results can be sent directly to MatLab for further analysis. The XVision2 system, developed by Greg Hager at Johns Hopkins University, has an interface to SVS. XVision2 concentrates on real-time segmentation and tracking in video images.
- **Affordable** - SVS™ comes bundled with Videre Design digital stereo heads. It is also available as a software system for a modest licensing fee.