

ERSP® Comparison Chart

Robotic Development Platform

	ERSP 3.0	ERSP 3.1
Installation	<ul style="list-style-type: none"> Linux: Partial manual installation required 	<ul style="list-style-type: none"> Linux: No manual installation
Distribution	<ul style="list-style-type: none"> Linux: Red Hat 7.3 Microsoft Windows: 2000 Pro and XP Pro 	<ul style="list-style-type: none"> Linux: Red Hat 7.3, Debian Sarge, and Fedora Core 3 Microsoft Windows: 2000 Pro and XP Pro
APIs (vSLAM®)	<ul style="list-style-type: none"> vSLAM integrated into Behavior Layer 	<ul style="list-style-type: none"> vSLAM available as stand-alone module (library) through C++ APIs
APIs (ViPR™)	<ul style="list-style-type: none"> Recognition of patterns and objects against database of patterns 	<ul style="list-style-type: none"> Improved recognition speed and performance. 3D/6DOF pose estimation relative to recognized pattern. Up to 30% reduction in memory usage. Training based on selected features in a user defined polygon. Support for hierarchical aggregation of models (of patterns for recognition).

vSLAM Performance (Position Error Statistics)

Error Statistics	ERSP 3.0	ERSP 3.1	% Improvement
25%	7.34 cm	5.89 cm	19.75%
50% (Median)	12.54 cm	10.41 cm	16.98%
75%	22.65 cm	17.69 cm	21.89%
85%	33.53 cm	21.31 cm	36.44%
95%	90.57 cm	23.45 cm	74.11%
Max	160.26 cm	66.38 cm	58.58%

ViPR Performance (Tested on 640 x 480 images)

Recognition	ERSP 3.0	ERSP 3.1	% Improvement
Speed	527ms	385ms	73%
Performance (complex database)	Up to 95%	Up to 97%	Up to 2%

ERSP 3.1 Detailed Feature Description

1) Linux installation

- a. Simplified Linux Installation Process. Leverages the infrastructure of model package handlers like APT. Minimal user input required (type of license and robot).
- b. Supported Linux kernel is automatically installed.
- c. Support for
 - i. Red Hat 7.3 with Linux kernel 2.4.20
 - ii. Debian Sarge, kernels 2.4.26, 2.4.27, 2.6.7 and 2.6.8
 - iii. Fedora Core 3, kernel 2.6.9
- d. Discontinued support for ViaVoices ASR and TTS engines (these engines are no longer available for novel Linux distributions).

2) vSLAM APIs

- a. Complete set of C++ APIs allow stand-alone operation and integration of vSLAM into commercial applications.
- b. Enhanced manipulation and removal of landmarks.
- c. Improved modularity and abstraction. The vSLAM system has been separated into two portions, the Front-End that is in charge of landmark creation and landmark recognition, and the Back-End that takes care of robot pose estimation and map updates.
- d. The vSLAM module supports plug-in of custom Front-Ends and Back-Ends for the system.

3) ViPR APIs

- a. Support for computation of the 3D relative pose between the current image and the model image.
- b. Support for selection and removal of features in portions of the image.
- c. New feature descriptor enables up to 30% of memory reduction at the cost of a few percents in recognition rate.
- d. Improved handling of subsets of models (hierarchical aggregation) without duplication of memory.

4) Miscellaneous

- a. Bug fixes
- b. Enhanced documentation
- c. Tuned obstacle avoidance on Scorpion
- d. Improved system reliability (including RCM communication)
- e. Support for Python 2.3

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