ROS and Gazebo Overview for DroneCode

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March 2015





Independent non-profit R&D company with a mission to support the development, distribution, and adoption of open source software for use in robotics research, education, and product development.

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Sensor Intelligence.

Open Source Robotics Foundation

The Goal: (Open Source) Rapid Prototyping



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ROS: Robot Operating System

Libraries and tools for programming robots



Used in labs, classrooms, and companies around the world



A common platform for many robots





https://www.youtube.com/watch?v=PGaXiLZD2KQ

Reusable autonomy

Example: The ROS Navigation Stack is used on a wide variety of robots











http://wiki.ros.org/navigation











Gazebo: Robot Simulation

Goal: best possible substitute for physical robot



Use cases:

- Design and testing of robot components and control
- Software testing and verification
- Competitions and other comparisons

Simulation capabilities





https://www.youtube.com/watch?v=RvfuKP5m0w0

Simulating humanoid robots





https://www.youtube.com/watch?v=iR4c0pWSAf8

ROS + Gazebo to control and simulate UAVs





https://www.youtube.com/watch?v=qfFF9-0k4KA

1.		United States	53,530	(23.40%)
2.		Germany	25,133	(10.99%)
3.	*	China	17,812	(7.79%)
4.	•	Japan	14,619	(6.39%)
5.	3	Spain	9,192	(4.02%)
6.	•	Canada	8,611	(3.76%)
7.		France	8,399	(3.67%)
8.		United Kingdom	7,434	(3.25%)
9.	0	India	7,360	(3.22%)
10.		Italy	6,623	(2.90%)
11.	•	Brazil	5,837	(2.55%)
12.	:0;	South Korea	4,988	(2.18%)
13.		Australia	4,828	(2.11%)
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15.	-	Russia	3,534	(1.54%)
16.	0	Portugal	3,194	(1.40%)
17.	=	Netherlands	2,556	(1.12%)
18.		Switzerland	2,454	(1.07%)
19.	-	Poland	2,279	(1.00%)
20.		Taiwan	2,252	(0.98%)

HEROS.org monthly visitors



Metrics (for July 2014)

Downloads:

Total packages: **3,570,374 (+123% over last year)** Unique IP addresses: **49,153 (+343%)** Does not count mirrors (8 public and many private)

Web activity: ros.org (wiki): Unique visitors: **87,820 (+48%)** Page views: **976,031 (31.5K / day**) answers.ros.org (Q&A forum): Total questions to date: **18,144 (+38%)** Answer rate: **68%**

Research use (as of January 2014):

Citations of "ROS: an open-source Robot Operating System" (Quigley et al., 2009): **1350 (+62%)**

ROS 2.0: Building on top of DDS

Data Distribution Service: industry-standard communication system



- Open source and proprietary versions available
- Proven in mission-critical applications
- Suitable for real-time and embedded domains

DDS power with ROS ease-of-use



Use the DDS implementation of your choice