

DARPA Cash for Locating & Identifying Quick Response codes (CLIQR)

Quest Challenge

Fiscal Year 2012 Report

April 17, 2012



Defense Advanced Research Projects Agency

TABLE OF CONTENTS

1	BACKGROUND	1
2	PROGRAM GOALS	1
3	PRIZE AUTHORITY UTILIZATION.....	2
4	CASH PRIZES AWARDED	2
5	SOLICITATION AND EVALUATION METHODS.....	3
6	RESOURCES USED.....	3
7	TECHNOLOGY TRANSITION	4
8	CONCLUSION.....	4
	APPENDIX A - PRIZE AUTHORITY STATUTE	A-1
	APPENDIX B - OFFICIAL RANKINGS FOR THE CLIQR QUEST CHALLENGE.....	B-1

1 BACKGROUND

This document describes DARPA's FY 2012 activities under the delegated prize authority.

Section 2374a of United States Code Title 10 authorizes the Secretary of Defense, acting through the Assistant Secretary of Defense for Research and Engineering (ASD(R&E)) and the Service Acquisition Executive of each military department, to conduct programs to award up to \$10 million in cash prizes to recognize outstanding achievements in basic, advanced, and applied research; technology development; and prototype developments that are potentially applicable to the military missions of the Department of Defense (DoD) (see Appendix A). ASD(R&E) delegated this authority under 10 U.S.C. § 2374a to the Director of the Defense Advanced Research Projects Agency (DARPA) and authorized the conduct of the DARPA Cash for Locating & Identifying Quick Response codes (CLIQR) Quest Challenge featuring a \$40,000 cash prize for the winner.

The DARPA CLIQR Quest was a prize-based competition that sought to advance the understanding of social media and the Internet and to explore the role the Internet and social networking play in the timely communication, wide area team-building, and urgent mobilization required to solve broad scope, time-critical problems. The Challenge began on February 23, 2012, when posters bearing the DARPA logo and a quick response (QR) code began appearing in US cities and continued through March 8, 2012. Participants had until 12:00 PM EST March 8, 2012, to submit the QR codes. A total prize purse of \$40,000 was offered to the first contest entrant to find and submit all the available QR codes.

No contest entrant found all seven codes. Erin Hewett, a PhD student in Biomedical Engineering at Georgia Tech/Emory University, was awarded \$17,143.00 for finding three of the seven codes; the three codes were found in 18 hours leveraging social media. Although not all seven QR codes were submitted by a single source, analysis from the experiment provides a baseline for further research into how information spreads through social media.

2 PROGRAM GOALS

The CLIQR Quest sought an understanding of how to effectively employ social media and the Internet to transform a crisis into an effort that unites people toward achieving a common goal, such as mobilizing aid. Insights were sought in how to achieve timely communication, wide area team-building, and urgent mobilization required to solve broad scope, time-critical problems.

The CLIQR Quest provided a structured, time-constrained, real-world contingency scenario to inform DoD protocols for engaging the public to assist in humanitarian assistance both at home and abroad. The results directly support the DoD Domestic Preparedness Support Initiative and the Office of Humanitarian Assistance, Disaster Relief, and Mine Action for overseas humanitarian assistance by increasing our understanding of advancements in social network theory.

In times of crises, the right resources must make it to the right area at the right time. Delays in finding those resources cost more than time and money; delays cost lives. Finding the most efficient method of resource identification and delivery is paramount and is a capability with clear relevance and importance to the military when it is called upon for assistance. Existing data sources and social network analysis techniques are not sufficient for accomplishing this task. The CLIQR Quest results provide insights on how global social media connections can be leveraged to provide humanitarian assistance to areas in need—insights that can be applied to future tsunami, earthquake, and hurricane disasters to mobilize aid and recovery networks.

The CLIQR Quest simulated public mobilization to efficiently identify and emplace essential relief aid materiel. The Quest, like an actual crisis, was not announced prior to the start date. Each relief asset was represented by a Quick Response code. The seven assets were batteries, food, radio, vehicle, fuel, water, and generator. QR codes were distributed throughout the continental United States to simulate the dispersion of resource concentrations throughout the country. CLIQR Quest participants tried to locate other participants who had located QR codes for key assets. The Quest lasted 2 weeks and as the notional assets were identified, they were allocated to simulated needs. The Quest scenario represented real-world situations requiring immediate situation awareness of asset sources and disaster responders who must efficiently transport assets to areas of need.

The objective of the CLIQR Quest was to be the first contest entrant to find and submit all the available CLIQR Quest QR codes within the allotted time. Unique QR codes were accessible at multiple public locations throughout the continental United States. QR codes were conspicuously displayed by DARPA representatives and were made available on business cards. The CLIQR Quest allowed the formation of networked teams to assist in finding all QR codes in an efficient manner.

3 PRIZE AUTHORITY UTILIZATION

The use of a prize for the CLIQR Quest allowed for a better simulation of how the social network on the Internet could be mobilized in response to a disaster. The intention was to award \$40,000 to the first entrant who found all QR codes or a prorated amount to the entrant who found the most codes. The contestants sent the QR codes to the Quest website (www.CLIQRquest.com).

Participation incentives and wide-scale outreach required the prize authority mechanism; the event would not be possible with standard authorities, such as contracts, grants, or cooperative agreements.

4 CASH PRIZES AWARDED

The Quest award of \$17,143.00 was made on March 16, 2012, to Erin Hewett, a PhD student in Biomedical Engineering at Georgia Tech/Emory University, for finding three of the seven QR codes; she found them in 18 hours. No additional prize money was distributed.

5 SOLICITATION AND EVALUATION METHODS

The DARPA CLIQR Quest Challenge was not publicized in advance. Using a prize incentive allowed entrants to self-select and allowed analysts to gain greater insights into use of the Internet by social networks. During the Challenge, media outlets, including MSNBC.com, CNN, and TechCrunch reported on the event.

DARPA modified an existing contract with PeopleBrowsr to conduct analysis during the Challenge. PeopleBrowsr provided deep analytics and insights based on a full Twitter firehose feed and influencer scoring system. The PeopleBrowsr deliverables were:

1. Comprehensive Twitter analytics during the CLIQR Quest Challenge, to include a daily report on US and global mentions of the Challenge
2. Detailed post-CLIQR Quest Challenge analysis report
 - a. Report total mentions of any term associated to the game
 - b. Provide only anonymous unique IDs (AUID) of mentioners by Kred score
 - c. Provide insights to DARPA team about the social virility and self-organization process of participants

The table below shows where each QR code was placed for the corresponding notional relief resource. The flow of data during the Challenge began with a scan of a displayed QR Code. If the participant entered the scanned information into the Challenge website, they were provided the opportunity to submit the code and enter the contest; some participants shared codes, accounting for more submissions than unique submissions. The winner received a code from another participant and opted to share some of the prize with that participant.

QR Code Locations	Resource	Scans	ID Generated	Submission	Unique Submission
Monterey, CA	Batteries	47	14	3	2
Tucson, AZ	Food	26	8	0	0
Columbus, OH	Radio	32	8	8	4
Fort Worth, TX	Vehicle	25	8	2	2
Atlanta, GA	Fuel	16	3	0	0
Orlando, FL	Water	16	2	0	0
Washington, DC	Generator	19	2	32	1
		181	45	45	9

6 RESOURCES USED

The DARPA CLIQR Quest Challenge was conducted over several weeks and made use of Government staff members, military interns, and support contractors to carry out the event. DARPA also contracted with a third party, PeopleBrowsr, to process and analyze the data.

Prize funds were drawn from the program element (PE) and project as follows:

PE	Project	Title	FY11	FY12	Total
0602303E	IT-02	University of California, Santa Barbara (UCSB)	\$ 17,143		\$ 17,143
0601101E	TRS-01	PeopleBrowsr TM		\$ 48,000	\$ 48,000

7 TECHNOLOGY TRANSITION

The DARPA CLIQR Quest Challenge provided an increased understanding of how social networks organize around a common theme. The hypothesis was that information brokers would emerge in the development of a network and could be identified through nodal analysis of activity. The Challenge demonstrated that of social networks formed as hypothesized, enabling DARPA to map and analyze the process through a semi-controlled scenario.

Subsequent to the event, DARPA discussed the results, methods employed, and potential ramifications with several organizations including PeopleBrowsr, US Department of Health and Human Services (Office of the Assistant Secretary for Preparedness and Response), and US Department of Homeland Security (Office of Resilience Policy). In addition, all four Services received information regarding and had exposure to this Challenge.

8 CONCLUSION

The DARPA CLIQR Quest Challenge achieved its goals and has helped DARPA advance the understanding of social media and the Internet and explored the role the Internet and social networking play in the timely communication, wide area team-building, and urgent mobilization required to solve broad scope, time-critical problems.

APPENDIX A

PRIZE AUTHORITY STATUTE

The prize authority statute, section 2374a of U.S. Code Title 10 was amended by Section 257 of the National Defense Authorization Act of 2006 and Section 212 of the National Defense Authorization Act of 2007 as follows:

§ 2374a. Prizes for advanced technology achievements

(a) **Authority.** The Secretary of Defense, acting through the Director of the Assistant Secretary of Defense for Research and Engineering and the service acquisition executive for each military department, may carry out programs to award cash prizes in recognition of outstanding achievements in basic, advanced, and applied research, technology development, and prototype development that have the potential for application to the performance of the military missions of the Department of Defense.

(b) **Competition requirements.** Each program under subsection (a) shall use a competitive process for the selection of recipients of cash prizes. The process shall include the widely-advertised solicitation of submissions of research results, technology developments, and prototypes.

(c) **Limitations.**

(1) The total amount made available for award of cash prizes in a fiscal year may not exceed \$10,000,000.

(2) No prize competition may result in the award of more than \$1,000,000 in cash prizes without the approval of the Under Secretary of Defense for Acquisition, Technology, and Logistics.

(d) **Relationship to other authority.** A program under subsection (a) may be carried out in conjunction with or in addition to the exercise of any other authority of an official referred to in that subsection to acquire, support, or stimulate basic, advanced and applied research, technology development, or prototype projects.

(e) **Annual report.**

(1) **In general.**—Not later than March 1 of each year, the Secretary shall submit to the Committee on Armed Services of the Senate and the Committee on Armed Services of the House of Representatives a report on the activities carried out during the preceding fiscal year under the authority in subsection (a).

(2) **Information included.**—The report for a fiscal year under this subsection shall include, for each program under subsection (a), the following:

(A) A description of the proposed goals of the competitions established under the program, including the areas of research, technology development, or prototype development to be promoted by such competitions and the relationship of such areas to the military missions of the Department of Defense.

(B) An analysis of why the utilization of the authority in subsection (a) was the preferable method of achieving the goals described in subparagraph (A) as opposed to other authorities available to the Department, such as contracts, grants, and cooperative agreements.

(C) The total amount of cash prizes awarded under the program, including a description of the manner in which the amounts of cash prizes awarded and claimed were allocated among the accounts of the Department for recording as obligations and expenditures.

(D) The methods used for the solicitation and evaluation of submissions under the program, together with an assessment of the effectiveness of such methods.

(E) A description of the resources, including personnel and funding, used in the execution of the program, together with a detailed description of the activities for which such resources were used and an accounting of how funding for execution was allocated among the accounts of the Department for recording as obligations and expenditures.

(F) A description of any plans to transition the technologies or prototypes developed as a result of the program into an acquisition program of the Department.

(3) Suspension of the authority for failure to include information.—For each program under subsection (a), the authority to obligate or expend funds under that program is suspended as of the date specified in paragraph (1) if the Secretary does not, by that date, submit a report that includes, for that program, all the information required by paragraph (2). As of the date on which the Secretary does submit a report that includes, for that program, all the information required by paragraph (2), the suspension is lifted.

(f) Period of authority. The authority to award prizes under subsection (a) shall terminate at the end of September 30, 2013

APPENDIX B

OFFICIAL RANKINGS FOR THE CLIQR QUEST CHALLENGE

Although several of the game pieces were scanned, only three individuals submitted to the DARPA website. Listed below are the three individuals who submitted QR codes ranked by the fastest submittal time.

Three of Seven Codes Submitted			
Place	User ID	Key Code Submitted	Date Submitted
1	5	FUEL-BE3A0519-7A81-4ABC-8F89-A8EE69B95B9B	2/24/2012 12:07
	5	GENERATOR-0022CB5A-F63B-4415-8E8E-C5CCB4D1DCE2	2/24/2012 15:45
	5	WATER-712A4369-EFFD-4639-ADFF-740B966150DF	2/24/2012 16:33
2	10	GENERATOR-0022CB5A-F63B-4415-8E8E-C5CCB4D1DCE2	2/24/2012 15:54
	10	WATER-712A4369-EFFD-4639-ADFF-740B966150DF	2/24/2012 16:04
	10	FUEL-BE3A0519-7A81-4ABC-8F89-A8EE69B95B9B	2/24/2012 16:35
3	2	WATER-0221F202-208D-410A-87A2-5B82B3B8864C	2/23/2012 18:20
	2	GENERATOR-0022CB5A-F63B-4415-8E8E-C5CCB4D1DCE2	2/24/2012 17:01
	2	FUEL-BE3A0519-7A81-4ABC-8F89-A8EE69B95B9B	2/24/2012 17:02