

Appendix 1
STARCHASE REPORT
Proposed Research in Brief
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In order to investigate how StarChase functions in the real-world, the experiences of two different types of agencies were examined. Both an agency that patrols highways and freeways, the Arizona Department of Public Safety, and a large urban police department, the City of Austin, Texas were assessed. This Report describes the experiences as reported by officers who are most familiar with the technology and activities in the two agencies.

The Arizona Department of Public Safety

During the night of 31 January 2013, Officer Korey Lankow of the Arizona Department of Public Safety took me on a ride-along to observe him during his shift and to discuss his experiences with StarChase. After signing the Consent Form and briefing me on my responsibilities as a civilian observer, Officer Lankow took me with him while he performed his customary tasks. Officer Lankow stopped a number of vehicles for a variety of violations and interacted with the drivers and passengers in a professional and courteous manner. Once the traffic stops ended, he briefed me on what he was looking for and how he interpreted the cues and signs he observed from the drivers and passengers. He explained to me the potential hiding places for drugs on the different vehicles he stopped, and how he read the driver's signals and cues.

The driving time was spent discussing the issues of pursuits in general and StarChase specifically. Officer Lankow has deployed StarChase 21 times and is likely the person who has deployed it more often than anyone else in the line of duty. He has deployed it using the remote and interior triggers and at low speeds and high speeds. He has had successful

applications, with subsequent apprehensions and seizures of contraband and unsuccessful applications where the projectile did not stay on the vehicle. Overall, he believes StarChase is a device that has made policing less risky for himself, the community and the fleeing suspects and their passengers.

StarChase is a device that is designed to tag and track a vehicle that flees from the police. It involves firing a projectile that has a GPS sending unit embedded into a projectile that is deployed from the police car. The projectile has adhesive that adheres to the target vehicle without the driver knowing about it. On 1 February, I spent time with Officer Keith Duckett of the Arizona Department of Public Safety who has deployed StarChase ten times and is currently waiting for the device to be installed in his new vehicle. I also spoke to Major Larry Scarber of the Southern Patrol Bureau. Officer Rob Telles was not available during my site visit but has deployed StarChase three times. The following observations reflect a compilation of the officers' comments, ideas, perspectives and thoughts that were discussed during my two day site visit with the Arizona Department of Public Safety officers.

The Arizona Department of Public Safety has been an agency that has historically been involved in a relatively large number of pursuits. The Southern Patrol Bureau, whose headquarters is in Tucson, is responsible for a large area and population including highways and freeways where drug smugglers are known to travel. The officers are trained to look for a variety of cues to help them determine the likelihood of someone carrying drugs or drug money. StarChase is designed to track violators without raising the risk to the public and was welcomed by the Arizona Department of Public Safety and its officers who were selected to test it.

StarChase requires that it be armed or “warm up” before deployment, which takes approximately 10 seconds. The normal process is for officers to arm the unit prior to initiating a stop so it is ready for use. This process also involves the use of a laser light to aim the projectile. Officers do not always arm the system and usually do so only when they have indicators that there is a reasonable chance the suspect will flee. When pressed about the indicators, the officers rely on their “gut” feeling and experience to decide when to arm StarChase. The officers did explain that certain types of vehicles have better potential hiding places than others and are used more often by drug smugglers.

As with any new technology, there are aspects of StarChase that are improved with testing and experience. The officers explained that after only a few deployments in training and experience aiming StarChase they become comfortable in its use and limits. The most complicated aspect of StarChase is aiming it by manipulating the unit by using the internal controls and/or by steering the police car to point the device, which is aided by a laser light. Training and experience can bring an officer to a comfort level, but the tasks involved in aiming the unit at high speeds can be tricky and risky. During the beginning phases of testing, officers had experience with cartridges that did not stick to the target vehicles. Some of the early applications failed as the cartridges would bounce off the targets. This failure was reported and corrected by the manufacturer and recently these officers have not experienced any failures.¹ Another issue raised was the timing of the device that armed StarChase. In one instance an officer was concerned about the potential of a target vehicle fleeing and armed StarChase in

¹ Major Scarber has reported that other officers, Casey Yartym and Howard McDonald, have experienced recent failures where the projectiles failed to stick to suspect vehicles.

anticipation of the stop. Unfortunately, the stop did not occur immediately and StarChase “cycled off” and when the officer went to deploy, it was not armed and ready. While the officer admitted it was his error in not re-arming the unit, it is important to understand that they have a lot of things to think about and if possible the technology should assist them as much as possible.

Before deploying StarChase, it is necessary to aim it with use of the laser beam. The current units utilize a small green laser or beam to help the officer aim the unit. The light shows as a dot on the vehicle which is the target location. The officer can aim the unit by manipulating it with directional controls inside the vehicle. It can also be aimed by steering the car to improve the contact point until the dot is where the cartridge is intended to hit. While I did not observe this light from a target vehicle, I did hear a suspect ask about the green light he saw in his rear-view mirror prior to being pulled over.

Normally, the arming, aiming and deploying StarChase is a relatively simple set of tasks that takes minimal training to become proficient. The major difficulty with StarChase is during high-speed deployments, possibly at speeds between 80 – 100 MPH. These deployments require the officer to drive fast and within 20 feet of the target vehicle before StarChase can be deployed. While the officers were comfortable with their abilities to drive aggressively to deploy StarChase, they agreed that not all officers would want to take those risks by driving so fast at such a close proximity to the fleeing vehicle. The officers also were comfortable that many officers would be comfortable executing such a maneuver and that many officers have asked how they could get a StarChase in their vehicle.

Once StarChase is deployed successfully the officers terminated their active attempt to pursue the fleeing suspect by turning off all emergency equipment and slowing down and blending into traffic. This allowed the fleeing suspect to “escape,” and after realizing the police were no longer trying to catch them they would slow down. StarChase creates data that shows the exact time, speed and distance that “tagged” vehicles travel until they slow down or return to the speed limit. The officers report that they would have terminated many of the pursuits in which they tagged vehicles because of the risks created by the traffic congestion, extreme speeds, and/or other environmental factors. Some of the pursuits would have been continued and the outcome while unknown may likely have ended negatively with crashes or injuries. Without StarChase many offenders would have escaped and many of them and innocent civilians could have been injured. Because of the tagging and tracking, many of them were arrested without incident and their contraband seized. An interesting but unintended consequence of Star Chase was noted by Major Scarber. He is aware of several situations where officers under his command have not initiated stops of vehicles that have been confirmed as stolen, or when the officer has a belief that the driver may flee, when a police vehicle with Star Chase is in the area. Rather than initiating the stop, the officer will call for the police vehicle with Star Chase to tag the vehicle before initiating the stop. While it is not known how many vehicles have fled in these situations, it is an important behavior to document in the future. See Appendix A for 36 case studies of successful applications of StarChase.

One specific example (case study #2) of a successful tag involved a pick-up truck with nine "illegal" teenage girls from Mexico. The driver of the pick-up pulled over when the officer initiated an enforcement stop but fled as the officer approached the vehicle after stopping it.

StarChase was remotely activated. The vehicle fled at a high rate of speed and slowed only after the driver realized he wasn't being chased. The pick-up was tracked to the "stash house," the girls were located hiding in the pick-up and brought to Immigration Customs Enforcement (ICE) and interviewed. Arrests were made and the girls stated they were told they were headed to the east coast to be maids and housekeepers for wealthy Americans, it is very likely they were headed to be traded as sex slaves. As the officer said, "Drugs/ money/weapons/stolen vehicles receive much attention, but human life is more valuable than all of these. Without this technology, I would have pursued the truck and based on the recorded speeds after fleeing, all occupants may have been killed if the vehicle crashed. This was an incident I wanted to share because it involved possible loss of human life; priceless."

This example shows why the officers are very enthusiastic about the future of StarChase. They recommended its use by other agencies but caution that it requires risk taking and advanced driving skills. The selection of officers who use it is an important consideration.

Austin, Texas Police Department

On July 2, 2014 I met with Officer Marcus Davis, at the Technology Unit of the Austin, Texas Police department (APD). Officer Davis is in charge of keeping track of the StarChase deployments for APD and is an expert in the technology and conducts the training for the APD officers. He relayed that StarChase has been deployed 25 times in the 13 months that it has been available at APD, and they have a success rate of 55%, meaning that the GPS Tags stuck to the vehicle and arrests were made in each of the successful deployments.

He explained that in some deployments, even when the GPS Tags did not stick on the targeted vehicle, drivers pulled over because they were startled by the noise of the Tag hitting the car. He showed several videos of those events as well as other deployments when the Tags stuck to the targeted vehicles. He also explained that most of the unsuccessful deployments were due to the officers not following training and deploying the Tags in wet weather or not lining up the target properly. He showed several videos of these examples.

Officer Davis stated that he has spoken to the deploying officers and has heard multiple comments that they feel safe and more confident with StarChase as they can keep more distance between them and the suspect vehicle and do not have to take unnecessary driving risks. He concluded our conversation by stating how much he liked the StarChase technology as an added tool in the officer's toolbox, and said, "I would buy stock in the company."

Summary

This initial assessment of the experiences from two different law enforcement agencies showed great promise for StarChase and its ability to be a "game changer" for law enforcement. While there are selection issues for officers, and it will be necessary to check and perhaps modify training protocols and proficiency testing, the results of successful applications to date are impressive. Suspects whose vehicles are tagged behave as if they are free from the police and slow down when the police stop chasing, in many cases within a minute. The behavior of the fleeing suspects demonstrates no knowledge that they are being tracked by a GPS system that pinpoints their location and speed in real time. In most cases, officers have tactically apprehended suspects and seized vehicles and contraband without creating a risk to the public, themselves or the suspect or any passengers.

The present assessment is a preliminary step in an evaluation process that will require an in-depth analysis of multiple StarChase units used by different officers in a variety of agencies. A comprehensive evaluation will need to explore deployment decisions and strategies, data on effectiveness and results of applications in different situations and environments, officer's and suspect's perceptions of StarChase and the impact of the technology on the organization, including behavior changes of officers who are not using Star Chase.

Appendix A

Case Studies

StarChase has the ability to track fleeing suspects, and apprehend them without a dangerous pursuit. The anecdotal information provided by officers who have used the device is impressive and shows how well the technology performs in the field. One of the major concerns of a pursuit is the behavior of the fleeing suspect who drives dangerously and recklessly, often checking his or her rearview or side mirrors to determine where the pursuing police car is located and if it still has its emergency lights illuminated and if it is still chasing. Up until now, the only information we have had concerning the actions of the fleeing driver is an estimate of the pursuing police officer or the fleeing suspect (Schultz et al., 2009). StarChase sends back real-time information on the speed, direction and location of the target vehicle to the computer that maintains communication with StarChase. There are a total of 36 case studies submitted with this report.

The data was collected from the established NIJ test beds and StarChase customers, who have agreed to participate in the data collection. When a tag is successfully deployed, there have been no follow-on high-speed pursuits, loss-of-life, injuries or property damage. Out of the 36 case studies, there were a total of:

- 13 stolen vehicles recovered with no property damage
- 25 humans rescued due to human smuggling plus three children that were in a fleeing vehicle during the pursuit.
- 2 DUIs resolved with no loss-of-life
- Over 4000 lbs. of drugs recovered
- 44 Arrests were made

On average, the case studies also report the time to return to within 10 MPH of a posted speed limit is under two minutes. 10 MPH is an estimate of the time it takes for a vehicle to blend into traffic and return to “normal driving behavior” which is no longer aggressive, evasive or impulsive. Of the 36 case studies, arrests were made in over 80% of the events.

Case Study #1

A vehicle was identified as stolen by the officer. The vehicle took off reaching a top speed of 78 MPH and the total tracking time was 3 Min 50 Sec. The officer did not chase and 1 Min 40 Sec after being tagged, the vehicle slowed within 10 MPH of the speed limit. There were no injuries, accidents or property damage. There were three arrests and a gun recovered.

Case Study #2

A vehicle was observed that the officer suspected was transporting drugs or people. The vehicle took off reaching a top speed of 68 MPH and the total tracking event lasted 4 Min 31 Sec. The officer did not chase and within 2 Min 45 Sec after being tagged, the vehicle slowed within 10 MPH of the speed limit, and it was driven to a house where officers arrested the driver and rescued nine young females.

Case Study #3

A vehicle was observed that the officer suspected was stolen. The vehicle took off reaching a top speed of 90+ MPH and the total tracking event lasted 24 Min. The officer did not chase and 15 Min

after being tagged, the vehicle slowed within 10 MPH of the speed limit. The driver of the stolen vehicle was arrested, the vehicle was recovered.

Case Study #4

The officer suspected a car was carrying narcotics and was travelling almost 100 MPH. The tracking event lasted 5 Min 31 Sec and there was no chase. 4 Min after being tagged, the vehicle slowed within 10 MPH of the speed limit. The driver of the stolen vehicle was arrested along with one other, the vehicle was recovered and 500+ lbs. of drugs was confiscated.

Case Study #5

A vehicle was observed at 84 MPH and the officer suspected it was stolen. The tracking event lasted 10 Min 40 Sec and there was no chase. 2 Min 30 Sec after being tagged, the vehicle slowed within 10 MPH of the speed limit. The driver of the stolen vehicle was arrested along with one other, and two children were safely removed from the vehicle.

Case Study #6

A vehicle was observed that the officer suspected was carrying narcotics in the car. The tracking event lasted 18 Min and there was no chase. 6 Min after being tagged, the vehicle slowed within 10 MPH of the speed limit. 200+ lbs. of drugs were confiscated.

Case Study #7

A vehicle was observed at 90+ MPH and the officer suspected there were narcotics in the car. The tracking event lasted 2 Min and there was no chase. 50 Sec after being tagged, the vehicle slowed within 10 miles per hour of the speed limit. 700 lbs. of drugs were confiscated.

Case Study #8

A vehicle was observed at 83 MPH and the officer suspected it was carrying narcotics. The tracking event lasted 12 Min and there was no chase. 3 Min after being tagged, the vehicle slowed within 10 MPH of the speed limit. Two arrests were made, 1600 lbs. of drugs and a vehicle were recovered.

Case Study #9

A vehicle was observed at 85 MPH and the officer suspected it was a drug scout car. The tracking event lasted 50 Min. and there was no chase. 6 Min after being tagged, the vehicle slowed within 10 MPH of the speed limit. No arrests were made, but the vehicle was recovered.

Case Study #10

Officer proactively tagged a stolen vehicle. Tagged at 17 MPH and the vehicle yielded. It did not exceed the speed limit.

Case Study #11

Officer tagged a stolen vehicle with a top speed of 50 MPH and the driver did not exceed the speed limit. Driver originally fled but was found and arrested. The tracking event lasted 2 Min.

Case Study #12

Officer tagged a suspected DUI and the entire tracking event lasted 2 Min 42 Sec. The individual did not exceed the speed limit and was arrested for DUI with a top speed of 47 MPH.

Case Study #13

Officer tagged a suspended license plate and the tracking event lasted 3 Min 30 Sec with a top speed of 56 MPH. Suspect arrested prior to urban no pursuit area and did not exceed the speed limits.

Case Study #14

Officer tagged a suspected DUI and the entire tracking event was 2 Min 43 Sec. The tag was deployed at 54 MPH and the vehicle did not exceed speed limit. Arrest was made.

Case Study #15

Vehicle failed to yield and officer tagged at 63 MPH as was headed into urban area. Lower speeds allowed safer navigation through narrow streets and intersections. The tracking event lasted 8 Min and 20 Sec. The time to return to within 10 MPH of the speed limit was 11 Sec. An arrest was made.

Case Study #16

The suspect failed to signal turn and was involved in a suspected narcotics transaction. Suspect fled and officer tagged the vehicle at 58 MPH. Suspect yielded and arrest was made. Total time of tracking event lasted 5 Min 38 Sec and time to return to within 10 MPH of the speed limit was 1 Min.

Case Study #17

A vehicle failed to yield was tagged as it took off at a slow speed. The vehicle pulled over and the driver on fled on foot with another passenger hidden in the backseat. The second passenger moved into the driver's seat and took off. Dispatch then notified officers of the tagged vehicle's movement and coordinated a stop on it. The event reached a top speed of 44 MPH and the tracking event lasted 4 Min 19 Sec. The second driver was arrested and one young child was found unharmed in the rear of the suspect vehicle. The vehicle did not exceed the speed limit.

Case Study #18*

The officer attempted to pull over a vehicle for a seatbelt violation and mismatched tags. After failing to yield to lights and sirens, the vehicle was tagged and escaped from Iowa into Nebraska. The fleeing offender reached maximum speeds of 88 MPH and was driving for the state line. The state patrol agency asked a neighboring state patrol, who was previously trained by StarChase, to log-on and track the vehicle. The officers tracked the vehicle into a state park and an arrest was later made with no accidents, injuries or property damage. This tracking event lasted 26 Min 25 Sec and the time to return to within 10 MPH of the posted speed limit was 1 Min 44 Sec.

Case Study #19*

The officer identified a stolen vehicle that was involved in a carjacking. The vehicle was tagged and did not exceed the maximum speed limit. There were no injuries, accidents or property damage. There were two arrests and the tracking event lasted 11 Min 5 Sec.

Case Study #20*

The officer identified a stolen vehicle with two suspects. One with two outstanding warrants, one with active probable cause for armed robbery. The vehicle was tagged at 50 MPH and did not exceed the speed limit. Two arrests were made with no accidents, injuries or property damage. The tracking event was 7 Min 52 Sec.

Case Study #21*

The officer identified a homicide suspect. The vehicle was tagged but the officers did not back off due to the severity of the charges. The suspect was apprehended/arrested without incident. No data on max speeds or duration of this event. There were no accidents, injuries or property damage.

Case Study #22*

The vehicle was successfully tagged using the officer remote while fleeing a traffic stop. The vehicle was tracked into a nearby municipality and the suspect was apprehended by another local agency with 225 lbs. drugs. The suspect was arrested with no accidents, injuries or property damage. The tracking event was 5 Min 49 Sec and it did not exceed the maximum speed limit.

Case Study #23*

The officer tagged a stolen vehicle. The suspect immediately bailed and was tracked by K-9. The suspect was arrested with no accidents, injuries or property damage. The vehicle did not exceed the maximum speed limit. The duration of the tracking event lasted 15 Sec.

Case Study #24*

The officer tagged a stolen vehicle with four occupants. The driver was arrested with no accidents, injuries or property damage. The duration of the tracking event lasted 8 Min 52 Sec with a high speed of 82 MPH. The time to return to within 10 MPH of the posted speed was 6 Min 59 Sec.

Case Study #25*

The officer tagged a stolen vehicle. The suspect stopped the car and ran before he was safely apprehended. The duration of the tracking event lasted 11 Min 5 Sec and the offenders did not exceed the speed limit.

Case Study #26*

The officer tagged a stolen vehicle with four occupants. The suspects stopped and ran, 3 of 4 were apprehended. The suspects were known gang members and established patterns of auto theft and vehicle burglary were reduced immediately after arrests. The duration of the tracking event was less than 1 Min and the offenders did not exceed the speed limit.

Case Study #27*

The officer tagged the stolen vehicle and traced it to a previously unknown vehicle dumping location. The officer thought that the tag missed but it bounced off the ground and stuck to underbody of car. The suspect was not apprehended due to delay in officer/dispatch looking for tag. There is no data provided on maximum speeds or duration of the event.

Case Study #28*

The officer tagged the stolen vehicle and two suspects were apprehended without incident. The duration of the tracking event lasted 9 Min 19 Sec with a high speed of 93 MPH. The time to return to within 10 MPH of the posted speed was just over 1 Min. At times, the speed exceeded the 10 MPH variance of posted speed with no aggressive or evasive behavior.

Case Study #29*

The K9 unit ID'd the stolen vehicle and tagged the car twice. The first round hit the suspect's bumper sticker and began to peel the bumper sticker off. The second round stuck as well. Both tags worked as designed and the officer was able to track the suspect a short distance to a 7-Eleven. There were no

injuries, no pursuit and no property damage. Three arrests were made. The duration of the tracking event was 42 Sec with a high speed of 27 MPH.

Case Study #30*

The officer successfully tagged a stolen mini-van. The duration of the tracking event lasted 45 Sec with a high speed of 27 MPH. No additional details shared.

Case Study #31*

The officer deployed the tag onto a suspected drug load. The officer successfully tagged the suspect at 80+MPH and was tracked until he slowed down enough to deploy stop sticks. The officer recovered most of the 15-17 UDAs with no injuries, accidents or property damage (aside from the blown tires). The duration of the tracking event was 32 Min 39 Sec with a high speed of 93 MPH. The time to return to within 10 MPH of the posted speed was under 1 Min of being tagged. At times, speeds picked up due to the event's duration but there was no aggressive or evasive behavior.

Case Study #32

The officer successfully tagged the suspects' vehicle when he failed to pull over. There were no injuries, property damage or further incidents. The duration of the tracking event was 1 Min with a high speed of 30 MPH. The speed limit was not exceeded.

Case Study #33

When the suspect failed to stop, the officer was able to successfully tag the vehicle and apprehend the suspect without incident. The duration of the tracking event was 2 Min 59 Sec with a high speed of 93 MPH. The time to return to within 10 MPH of the posted speed was 2 Min 24 Sec.

Case Study #34

The officer deployed the tag onto a suspected drug load that evaded. The officer tagged and tracked the suspect to location with air support assistance. The officer used StarChase mapping to act as central dispatch. The offender was US Citizen carrying 1100+ lbs. of drugs. The tag lead to a safe apprehension, assets seized, no accidents, injuries, or property damage. The duration of the tracking event lasted 28 Min 13 Sec with a high speed of 99 MPH. The time to return to within 10 MPH of the posted speed was under 30 Sec. At times speeds picked up due to the event's duration but there was no aggressive or evasive behavior.

Case Study #35

LPR showed the vehicle as stolen; officer deployed the tag onto the stolen vehicle after the suspect evaded. The officer coordinated with a neighboring jurisdiction and was able to safely stop and apprehend the offender. The stolen vehicle was recovered with no accidents, injuries, or property damage. The duration of the tracking event lasted 10 Min 28 Sec with a high speed of 87 MPH. The time to return to within 10 MPH of the posted speed was 54 Sec.

Case Study #36*

Officer successfully tagged vehicle in the rain. The duration of the tracking event lasted 1 Min 4 Sec with a high speed of 32 MPH. More details to come.

* These data were provided by a non-NIJ funded test bed but still a StarChase customer.