

RACESENSE

A CASE STUDY FROM THE 2023 VX ONE NA CHAMPIONSHIP



vakaros



THE PROBLEM

LACK OF EFFICIENT RACING

The VX Class sails in a wide array of venues with a range of Race Committees and their respective systems. What does this mean? Often, lots of time spent waiting around due to inefficiencies around the start line. Sailors pay hard-earned money to attend events: they want to **race on the water and have fun off the water**. Spending time sailing back and forth down the start line supports neither of those initiatives.

THE PING PARADE

Let's face it: no one enjoys the ping parade: pinging causes collisions, unnecessary wear on sails, lengthens the time between races, and takes away the Race Committee's ability to be agile. And, even still, marks drift and anchor lines stretch: pings are rarely accurate across a start sequence, and when done by hand, are a **leading cause of general recalls**.

INACCURATE OCS CALLS

Calling OCS boats on a long line is one of the toughest jobs in sailing: humans simply are not built to compare time and position accurately, and OCS calls suffer. From boats hiding behind a group to simple misjudgements of when 'go' is, our objective observations of even the best RO's in the world note that **over 50% of starts called by a person contain at least one errant call**.

GENERAL RECALLS AND AGGRESSIVE PREP FLAGS

General recalls are a nightmare for sailors and Race Committee alike. They expend excess time and energy on the water and do nothing to enhance the regatta experience. And, once RC is compelled to the U or Black flag, weekends and regattas can be ruined in a single start, often by a single meter.

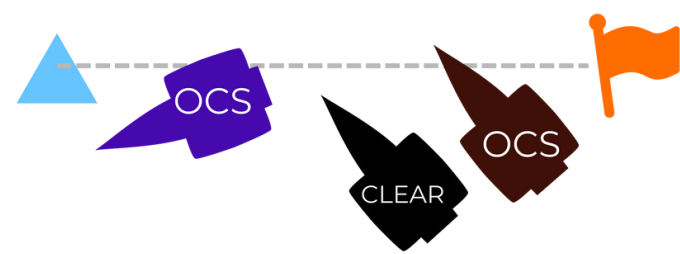
TIMING VARIABILITY

The wide array of elements that go into timing a start sequence often let over .5 seconds of error creep in. This is enough to be hugely significant in whether teams are over or not, and often is never considered when judging whether a start is fair or not. **Timing issues are the number one cause of errant start calls across the sport**.



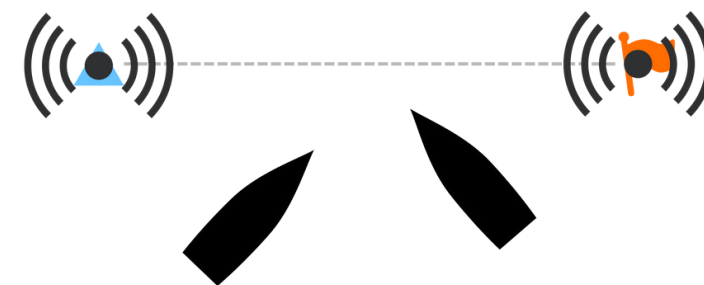
THE SOLUTION

RACESENSE IS RESPONSIBLE FOR



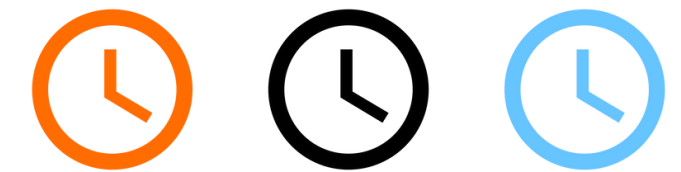
OCS DETECTION

RaceSense determines OCS status with 30 cm receiver positional accuracy and a projection of hull shape. Competitors are notified milliseconds after the start if they're over or not, so it's easier than ever to restart and get racing, and RC can focus more on setting fair courses.



LIVE BROADCAST PINGS

Live broadcast pings are ending the parade. Each Atlas 2 receives the position of each end of the line, live. So, when anchored marks swing or the RC anchor line stretches, your DTL value will update automatically.



AUTOMATIC TIMING

The vast majority of error in start line judgement comes from timing errors: by using synchronized GPS time, every Atlas 2, as well as the time at which OCS determination is made, are synchronized to the millisecond.

**RACE OFFICERS CAN FOCUS ON RUNNING
THE BEST RACE POSSIBLE**



VIRTUAL ONBOARDING

Weeks before the event, Vakaros provided written and visual educational materials to give competitors, who in many cases were new to RaceSense, the ability to dive into the technology that would be governing their racing. And, dive in they did: 75% of sailors strongly agreed that they understood what RaceSense is and how it works by the beginning of the event.

GOVERNING DOCUMENTS

PRO Mark Foster, Chief Judge Matt Bounds, Keven Eiber, and Vakaros collaborated to make appropriate provisions for RaceSense in the event NOR and SI. What did this take? A few brief lines specifying where the Atlas 2 needed to be mounted. Here's the entirety of RaceSense-specific language from the Sailing Instructions:

- 1.5 The Vakaros RaceSense system will be utilized by the Race Committee (RC). This changes RRS 41(c).
- 1.6 Each boat shall have a working Vakaros Atlas 2 configured for RaceSense at check-in, and shall be mounted on the aft side of the mast at all times while racing. Each boat shall either provide a working Atlas 2 at check-in for configuration with RaceSense, or an Atlas 2 will be provided, by the Organizing Authority (OA), to any boat that does not have one available.
- 1.7 Failure of an Atlas 2 or the RaceSense system shall not be grounds for opening a hearing considering redress. This changes RRS 63.1.

MOUNTING

As noted in the SIs, each team was required to mount their Atlas 2 in the same location, in the same orientation. This allows the system to make OCS calls using the entire hull. Each Atlas 2 comes with a pair of velcro straps, so teams could easily attach to their mast or in place of their current instrument.

CLASS BRIEFING

Prior to practice racing, the OA and Vakaros held a briefing to familiarize sailors with the Atlas 2, RaceSense, and allow for any questions. In the end, this ran for an hour, as sailors were able to gain the clarification they needed to race confidently.



PIN MOUNTING SOLUTION

EASY SETUP

RaceSense is as simple as installing a single Atlas 2 on each end of the starting line. Mount with our velcro straps, bolt on a bracket, or find your own solution.

A good sky view is important: the Atlas 2's dual-band GPS will achieve 30cm positional accuracy, but mounting in a compromised environment can decrease that accuracy.

Just like any race management task, proper prep before the event allowed this to be an afterthought at the VX NAs: we showed up each morning, mounted the devices, and left the dock. And, with the Atlas 2's 100+ hour battery life, there was no need to charge anything throughout the entire event.

And, to keep RC synced, the Atlas 2 on either end can be programmed to display a large timer: no more need to start a stopwatch or try and sync to the top of a minute. Every RC action can be synchronized to the official time that all competitors see on their devices.



BOAT MOUNTING SOLUTION

RUN RACES FROM A CENTRALIZED HUB

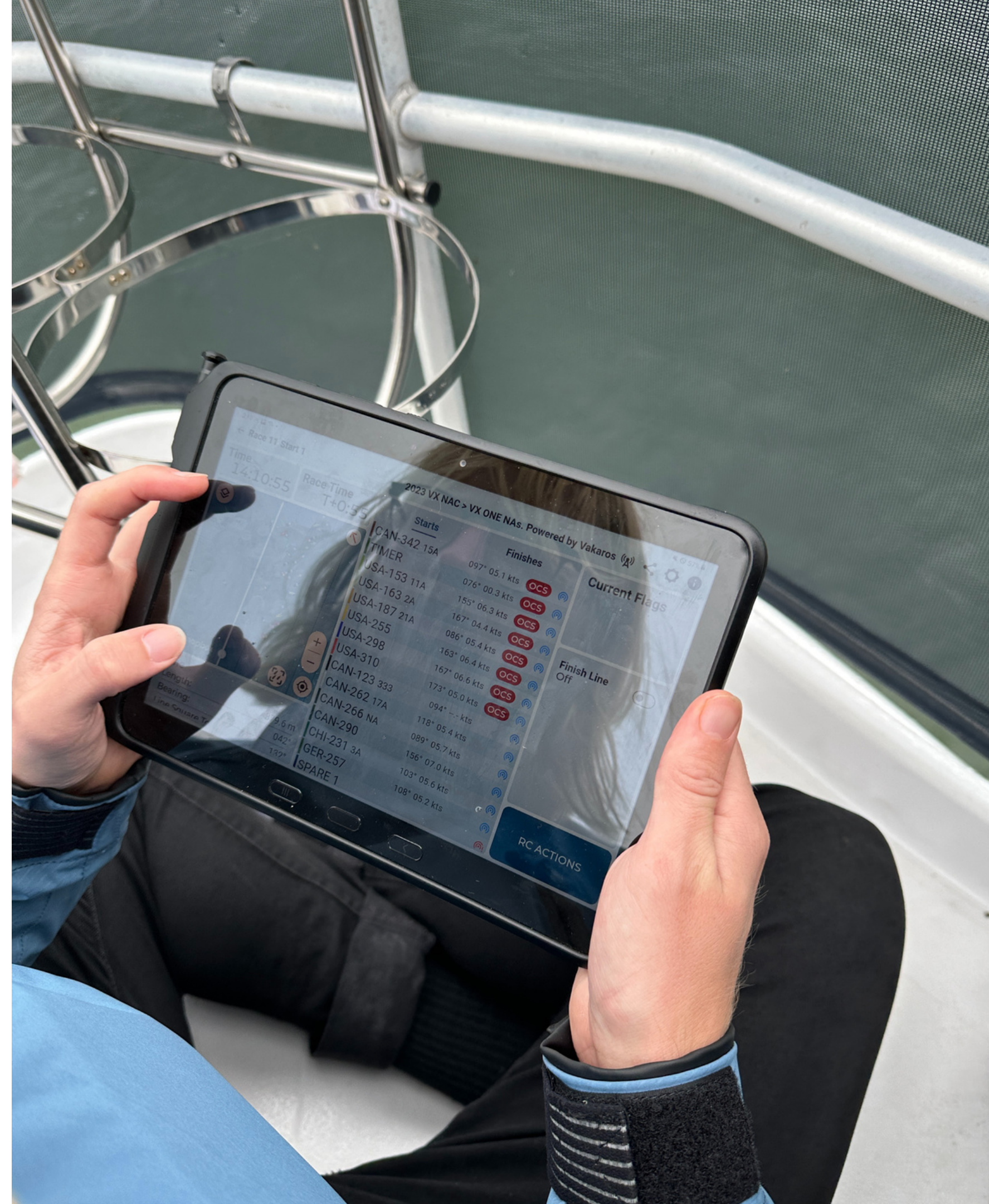
Race Committee starts timers, views OCS status, and more in a simple platform via our Race Control app.

At the beginning of the day, enter the Race Committee Dashboard and the network comes to life: each Atlas 2 checks in with RC and reports as present.

Scheduling a start takes four taps. An AP or N flag take three. And, watch the homepage to see the length of the starting line, bearing, live boat locations, and OCS status. This is the dashboard for running a regatta.

When it's time to take finishes, the RO is able to toggle one switch to turn on the finish line and automatically record positions. This data can then be exported to scoring platforms or spreadsheets.

Offsite viewers can see a simplified web version of this interface and get live feedback on timing, prep flags, OCS status, and more.





RESULTS

12 RACES IN THREE DAYS

4 HOURS OF PINGING ELIMINATED

9 NUMBER OF TOP-10 FINISHES BY TEAMS IDENTIFIED OCS IN THAT RACE

0 OCS/UFD REDRESS HEARINGS

7 RACES STARTED UNDER THE P FLAG

3 TOTAL GENERAL RECALLS

17 MAX NUMBER OF BOATS IDENTIFIED OCS IN A SINGLE START

2 FULL-CLASS DATA DEBRIEFS

6 CLEAR STARTS

1000 HOURS OF LUFFING SAVED

SAILOR FEEDBACK

“BEST TECHNOLOGY
THAT HAS BEEN ADDED
TO SAILING EVER!”

“I was not sure why we were doing this at the VX North Americans but went along with it..... It's the *coolest thing* for competitors and RC, making race management easier for our volunteers! RC can start a race 15 minutes out and use guns/flags at 5 minutes but all competitors are ready. You gets lots of races off without time wasted letting people ping the line etc. Mark Foster gave us a heads up on VHF on start time but the Vakaros just started and told us how far away we were and we had **100% accurate time without hitting a button.**”

“Should be
required for all
one design
racing”

“Would gladly pay
money to keep
using it”

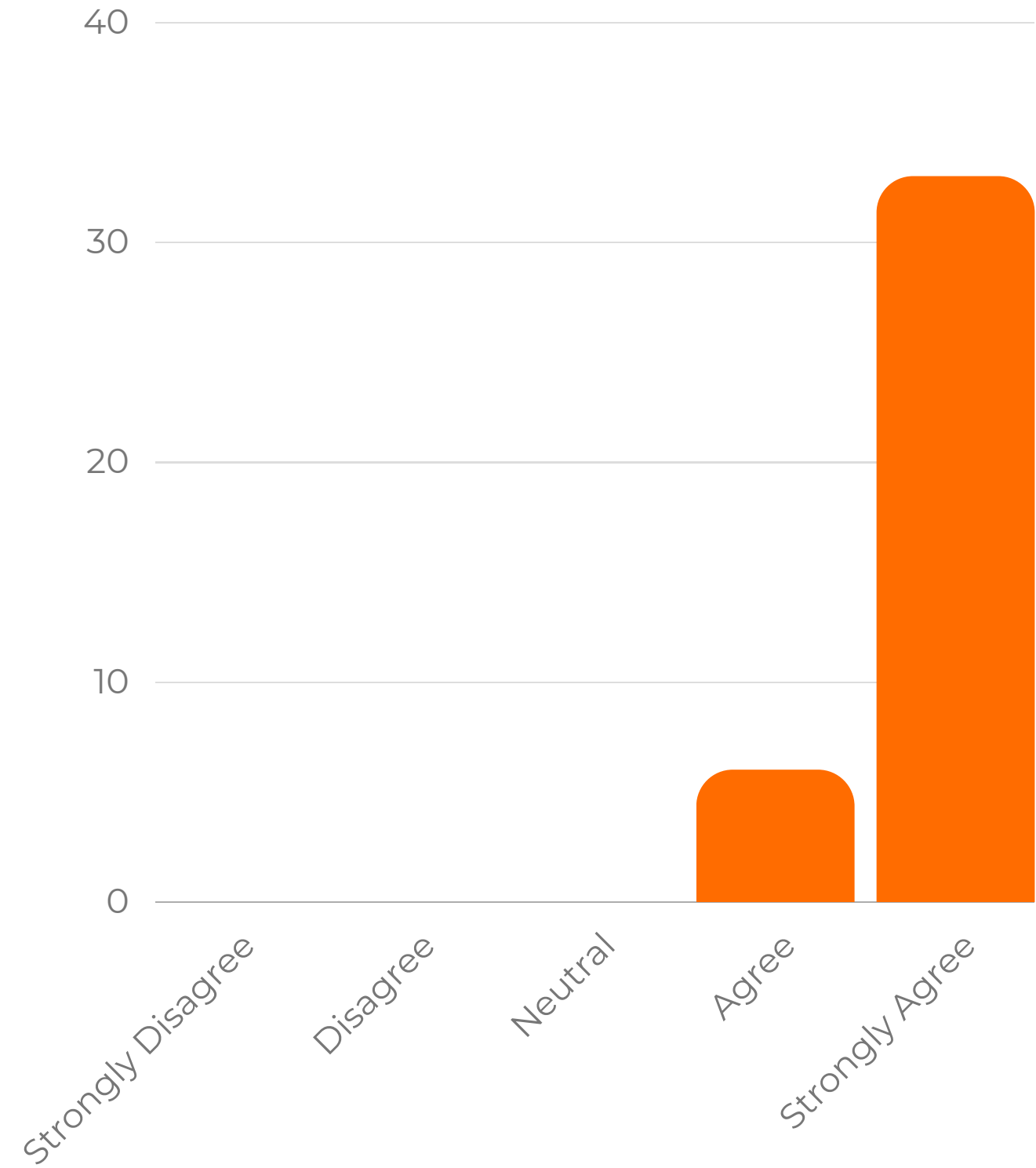
"Doug and team were outstanding! I hope the VX fleet uses this technology at every major event moving forward. It made the starting **so much more efficient**, and it was fantastic not having to ping, or wait to be hailed by the RC if over early. It also helped with line congestion while starting on the favored end.

I know of at least three of us at EYC, who will be ordering Atlas 2's before next season. Awesome job!!"

“Would love to have
RaceSense at **every event**
from now until eternity. It was
incredible.”

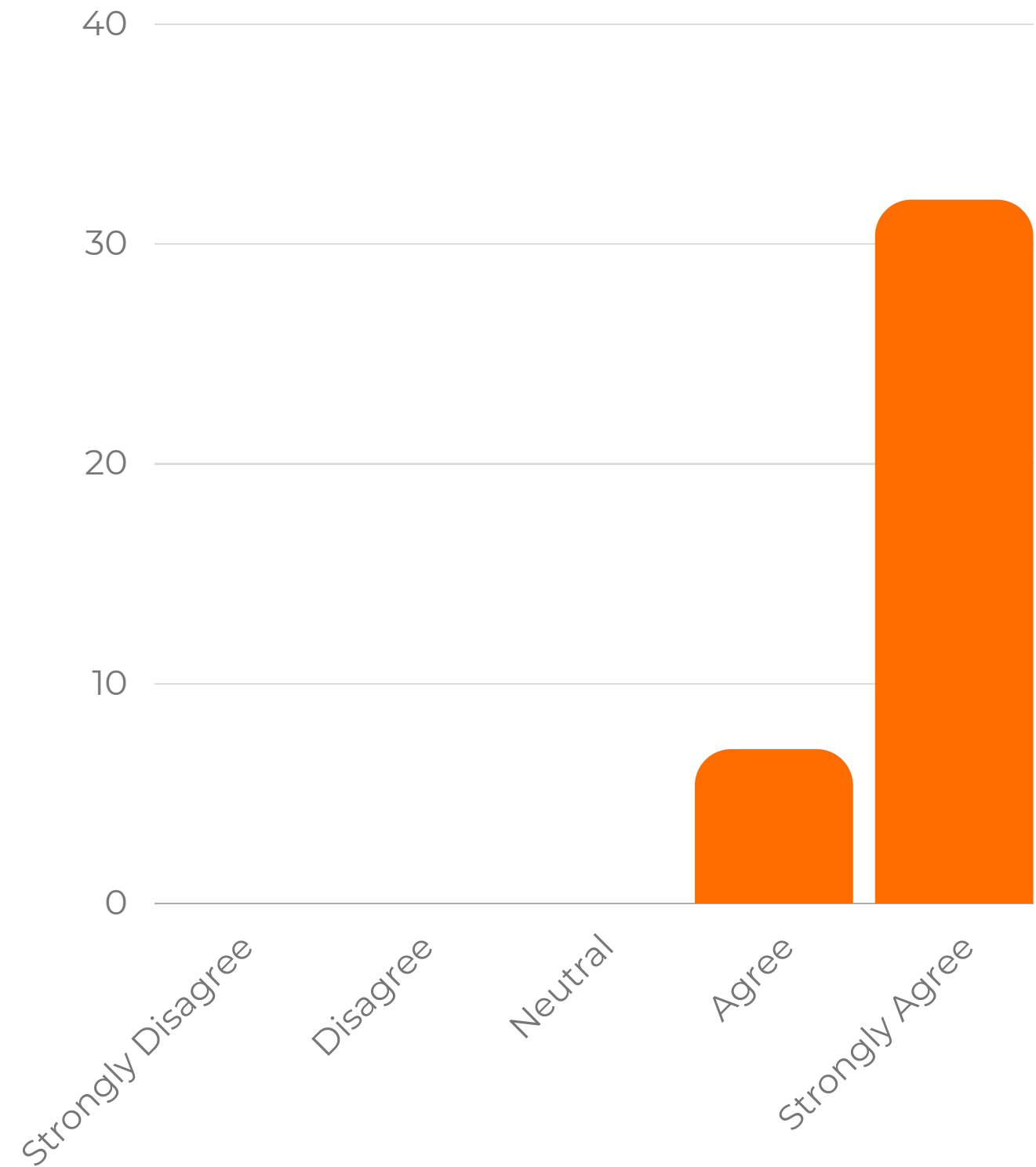
“It was amazing how the RaceSense and MarkSetBot got races off as fast as possible, especially Thursday when it was pouring down rain and any down time was miserable. **This is a game changer!!!**”

“RaceSense
made racing
fairer”

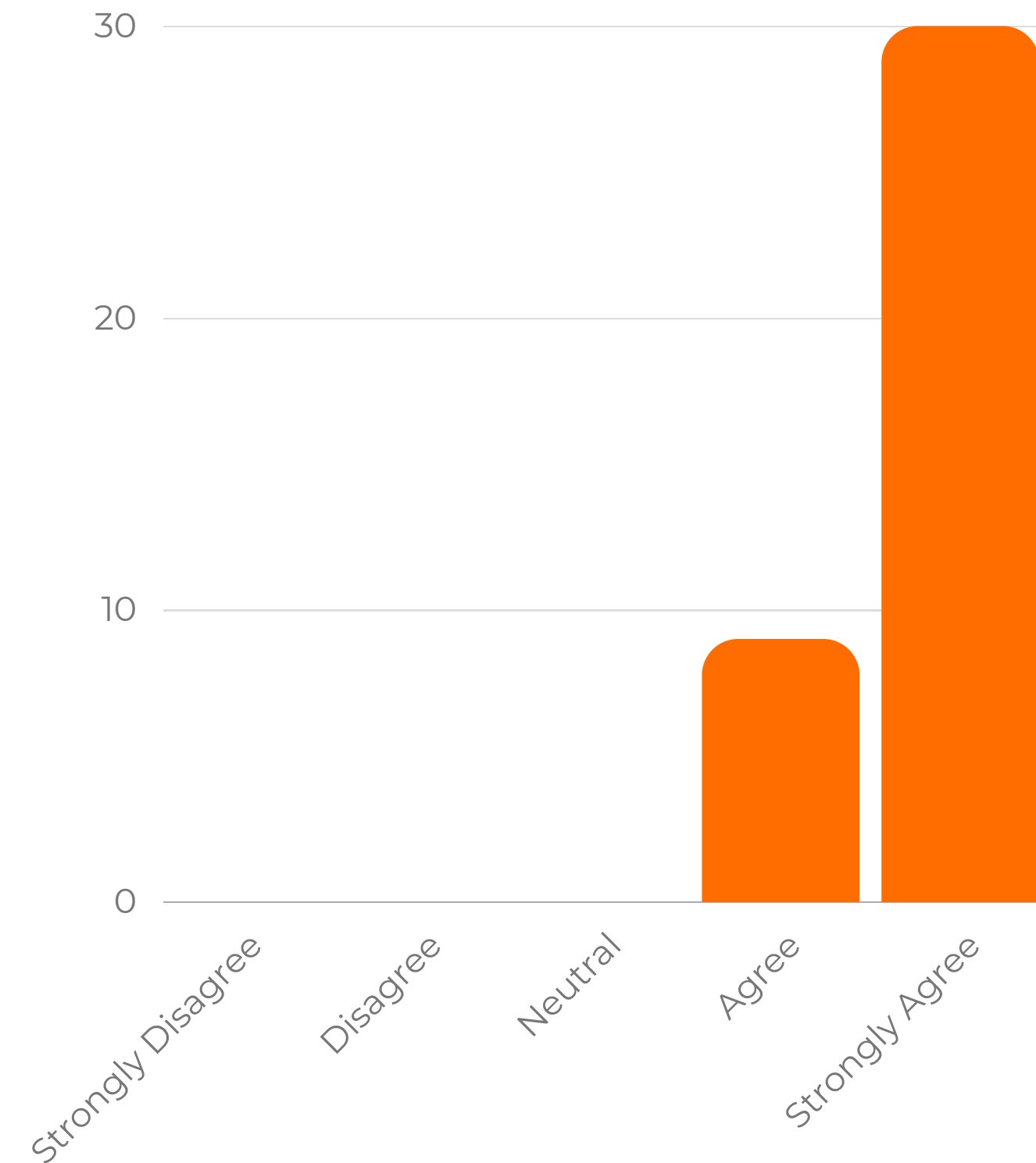


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“RaceSense
led to *higher*
quality races”

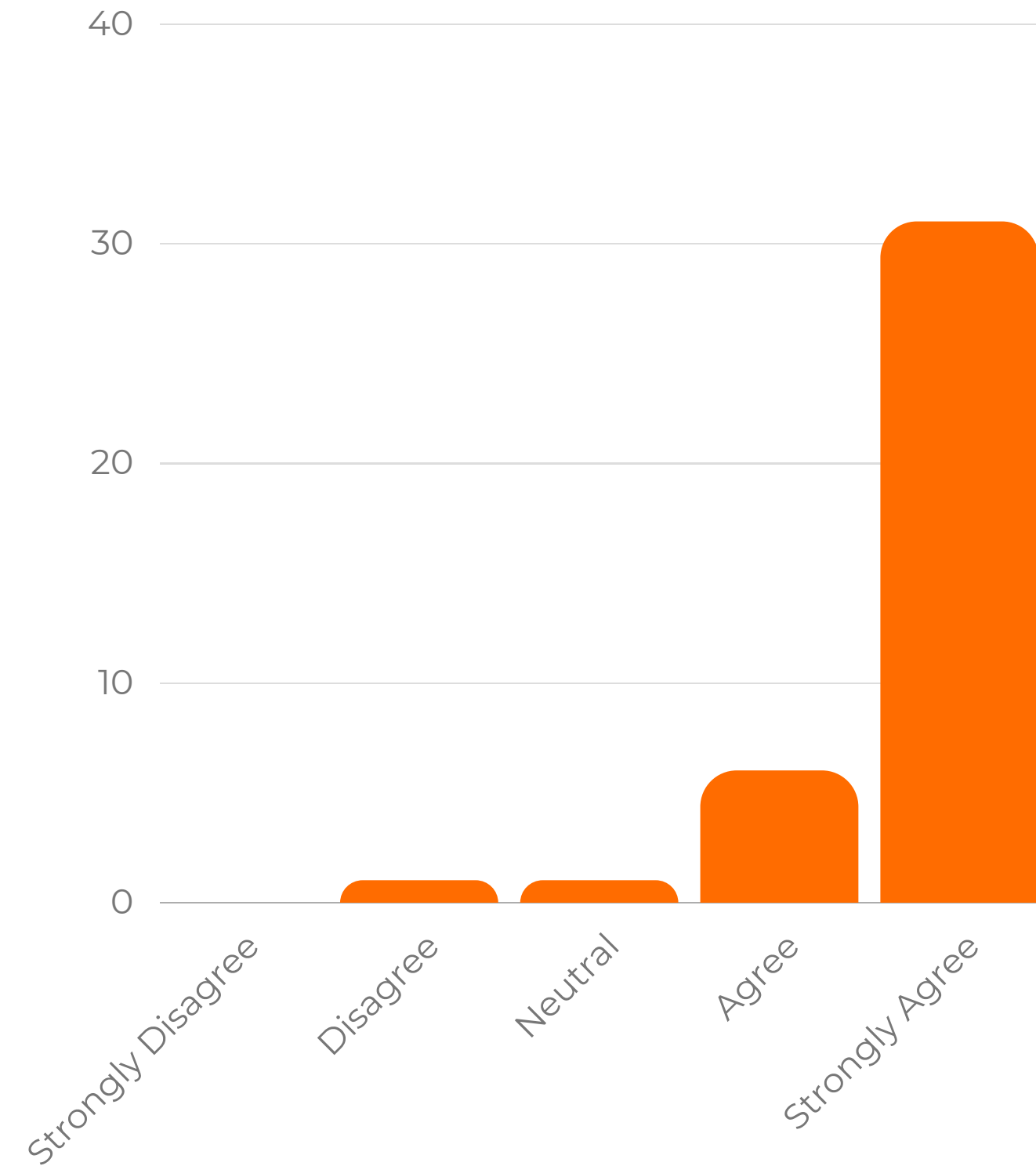


“RaceSense
allowed us to
*sail more
races*”

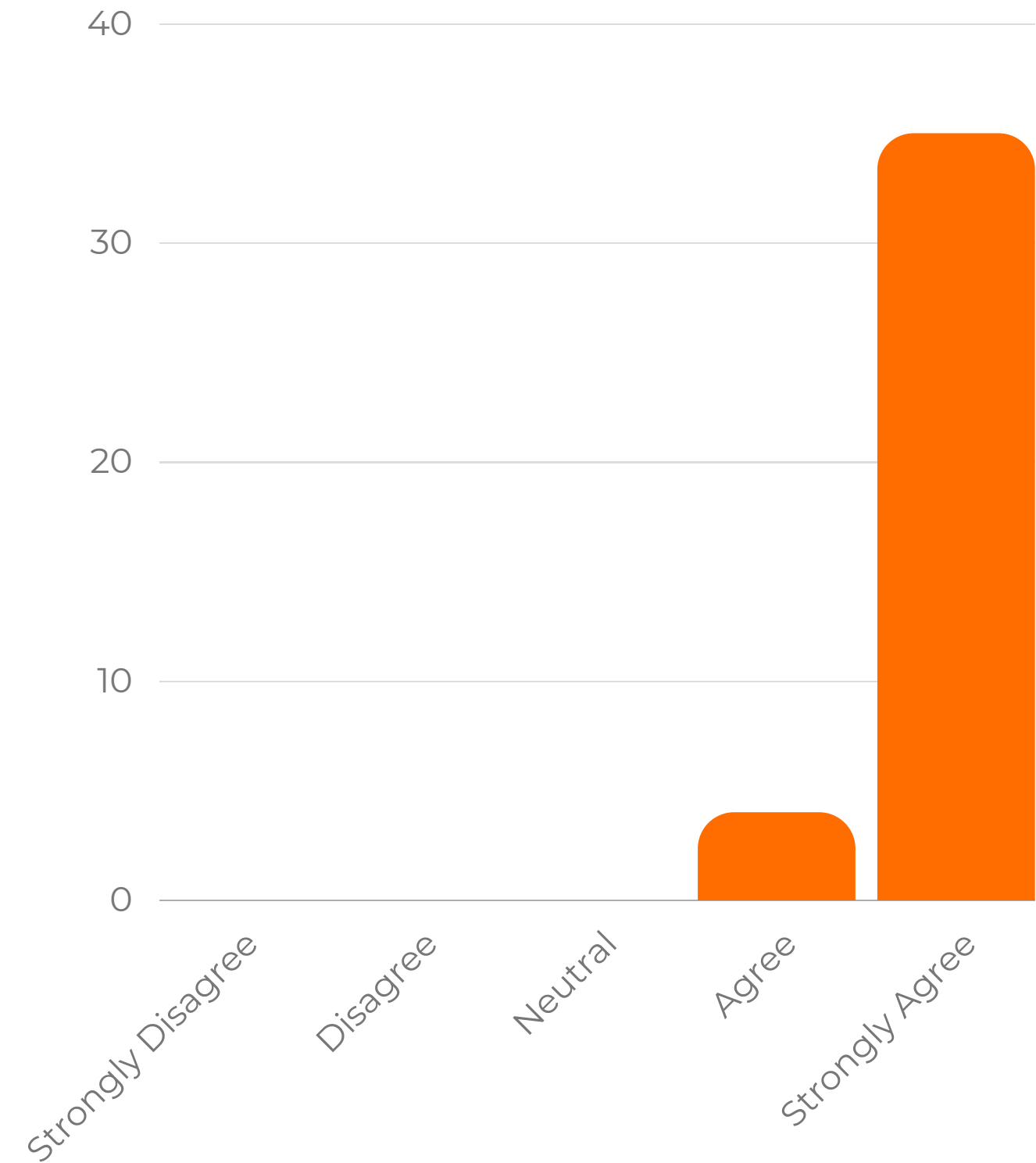


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“RaceSense
was *accurate*
and *reliable*”



“I would recommend RaceSense to my class for future events”







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