



XPRIZE
WILDFIRE



GORDON AND BETTY
MOORE
FOUNDATION

Track A: Space-Based Detection and Intelligence

Round 2: Semifinals System Technical Verification

Rules and Regulations v1.1

Released November 11, 2024

Version 1.0 was published on August 5, 2024. This is an updated version of the Rules & Regulations. Updates in this version are annotated with change bars (as shown here) in the left-hand margin.

Introduction

These Rules and Regulations are issued for the Semifinals System Technical Verification (STV) of XPRIZE Wildfire Track A: Space-Based Detection & Intelligence. This R&R is to supplement the [Competition Guidelines](#) (originally published April 21, 2023, superseded by Version 2.2 as of August 6, 2024). While the Guidelines remain in full effect as the primary document governing the competition, at each round of the competition, this R&R is published to provide necessary operational details specific to that round of the competition.

These Rules and Regulations detail the concept, requirements, constraints, boundaries and directives of the STV. All teams must adhere to this R&R at all stages of the STV while they are actively participating. Failure to adhere to these R&R may result in consequences as detailed in the Competitor Agreement.

XPRIZE may revise these Rules and Regulations at any time during the course of the competition to provide additional information or to improve the quality of the competition. Future versions, amendments, technical notes, or other documents may continue to elaborate on the operation of the competition, including exact dates and locations of events, specific technical thresholds for performance testing, and operational information. XPRIZE will make all final determinations on safe and acceptable operating conditions for the competition. XPRIZE reserves the right to disqualify teams who are found to be operating in an unsafe or unethical manner, whether at official testing sites or at their own facilities.

All competing teams will be notified of revisions in a timely manner. Official updates will be communicated to team leaders by email. Submit any questions using the [Team Questions Form](#), and send written communications to wildfire@xprize.org.

For the most updated version of the Rules, check xprize.org/wildfire, and always remember to replace your files with the most recent versions of official documents.

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1. Test Plan

1.1. Introduction

The XPRIZE Wildfire Track A: Space-Based Detection & Intelligence Semifinals System Technical Verification (STV) represents a significant stage in the competition where teams are required to demonstrate their advanced and innovative solutions for detecting, characterizing and delivering observations of wildfires to fire managers/decision-makers on the ground. The testing process is structured to offer a fair, thorough, and practical evaluation of the teams' solutions. This approach will also yield valuable observations and feedback for the teams, the panel of judges, and ultimately, the broader wildfire community.

The testing concept for the XPRIZE Wildfire Track A Semifinals STV involves gauging the analytical competence of teams' solutions in terms of the precision, accuracy, speed, and dependability of wildfire detection and characterization.

1.2. Objective

Teams are reminded of the end goal of XPRIZE Wildfire Track A. In the Space-Based Wildfire Detection & Intelligence track, teams will have one minute to accurately detect all fires across a landscape larger than entire states or countries, and 10 minutes to precisely characterize and report data with the least false positives to decision-makers on the ground.

STV is focused on the analytic portion of solutions, as competing teams will be asked to demonstrate the analytical strength of their proposed solutions. The assessment of team solutions will be carried out through the submission of data materials, with no outdoor testing occurring in this round.

1.3. Overview

The STV is conducted, per team, over a 12-hour real-time (RT) period. The STV consists of several test serials which are designed to test the analytic portion of teams' solutions. For each test serial, teams will be given a target time and location. Teams are then responsible for sourcing the data they require, analyzing the data and providing reports and intelligence to a level that would be expected of a fire management agency. In order to preserve competition fairness, XPRIZE will not notify teams of the number of target locations and/or time of desired observations prior to the STV window opening. XPRIZE will, however, ensure that teams have adequate time to produce the required analytics.

Using their unique solutions, teams will deliver their analysis, intelligence and data on their target observations to XPRIZE. Teams will be encouraged to demonstrate as much of their capabilities as possible, whilst meeting the STV test criteria. Judging of these capabilities will involve quantitative and qualitative measures as judges must assess numerous different solutions to the wildfire problem.

In order to provide a purely quantitative and equal judging baseline, XPRIZE and Esri will provide access to ArcGIS Online and Velocity. Esri's ArcGIS Online system represents the industry standard for geospatial information systems, particularly within earth observation and fire mapping. XPRIZE and Esri will provide all teams access to ArcGIS Online as well as to ArcGIS Velocity, which is a cloud-native add-on capability for ArcGIS Online. It enables users to ingest data from the Internet of Things (IoT) platforms, message brokers, or third-party APIs.

Teams will be provided with a URL to which they will POST mandatory data (see Section 1.4 POST URL). This URL forms the front end for Velocity and reduces the burden on teams to learn a new system which may not exploit their unique systems. In addition to posting to this URL, teams will be able to use ArcGIS Online at their discretion, using XPRIZE-provided credits, to demonstrate their capabilities through STV.

Teams planning on submitting data into ArcGIS Online via API will have the option of leveraging ArcGIS Velocity, a real-time engine, to stream data into the XPRIZE ArcGIS Online Organization. Should a team not wish to utilize Velocity to submit their data, that team will be responsible for making their data available within the XPRIZE ArcGIS Organization in an alternate manner. Teams should remain mindful that deliveries via Velocity, Online or other are still subject to the same scoring (Section 3); all timing and accuracy metrics are applicable across all platforms.

1.4. Test Methodology

The intention behind STV is for teams to observe specified targets, apply the analytic portion of their proposed solution, and provide the characteristics as per the Assessment Criteria contained herein (Section 3.1). Further information on the conduct of STV will be provided, in detail, in Test Procedures to be provided c. March 2025.

The System Technical Verification is designed to assess the analytic capabilities of teams within the constraints of being a simulation event. Teams will be hosted on Esri's ArcGIS Online and Velocity platforms. This tool allows for data aggregation across a wide range of sources, and enables AI-driven analysis across a range of inputs, ultimately empowering teams to provide the most detailed analysis to XPRIZE as possible. The test design mandates minimum requirements

in line with the Competition Guidelines, but also encourages teams to think in an operational context and deliver value-add data throughout.

Teams will be issued historical targets (a target = a time and a location to observe) which will be no older than 10 years old. From the commencement of their test window, teams will receive a number of subsequent target notifications, each of which will refine the target down in both temporal and spatial accuracy. For each target, teams will provide XPRIZE with analytics and intelligence based on the criteria issued in the Competition Guidelines.

At each notification, teams will be refining their models and reporting. Teams should provide as much continuous analysis as they see fit, including observed behavior and size-up information. To attain additional points, teams may provide any further analysis which may be of benefit to fire managers. Teams are reminded of the real-world operational context of their data, and are recommended to provide detailed analysis and intelligence accordingly.

STV has three submission or reporting methods: a POST URL (mandatory), teams' individual platforms (optional, encouraged) and ArcGIS Online (optional). Each presents differing outcomes and complexity. Teams should consider which method(s) they wish to use and will be required to declare this prior to April 2025, in a Developmental Check-in currently anticipated for February 2025. Through this methodology, judges will have like-for-like submissions to compare and assess mandatory data (via the URL), while teams will be empowered to demonstrate their full analytic capabilities in their own system.

POST URL

Submission of analyses and intelligence will be via URL POST; this submission is mandatory. Teams will be provided with a Data Dictionary and submission schema which will allow teams to report point and polygon data. POST data will be in GeoJSON format with example schema contained within these Rules & Regulations.

Individual Platforms

Analysis and intelligence, beyond the mandatory data above, may be provided via teams' individual platforms. In using their own platforms, teams will be able to demonstrate their full analytic capabilities within the context of historical data analysis. Teams using their own platforms must allow judges the ability to witness this in real-time; this may occur virtually or in-person, though XPRIZE may favor in-person attendance.

ArcGIS Online

In addition, teams will be able to use ArcGIS Online for all submissions. Use of ArcGIS Online is not mandatory, however if teams wish to use this platform then XPRIZE and Esri will facilitate introductory training. Within ArcGIS Online, all teams have been given two

environments: a Test environment for the development of their integration prior to STV; and a Production environment for use during STV. All teams have been granted an equal number of credits to use in their Test environment; this allocation will be provided by March 2025.

1.5. Test Timings

STV consists of the evaluation of historical data that is analyzed and sent to XPRIZE. As a result of this design, there are two concepts of time that are defined here for clarity.

Real-time (RT) refers to processing data or providing feedback almost instantly as events occur.

Simulated time (ST) refers to where time is advanced artificially within the historical targets, rather than progressing in sync with real-world time. In a simulation, time can be sped up, slowed down, or paused to analyze scenarios or events that might take days, hours, or even years in reality.

Each team will have a real-time 12-hour STV window. Within this, progressive Notifications will refine down the target; however, teams will have no warning of when these Notifications will occur.

Reporting timelines

Report & Timeframe	Real or Simulated Time?	Comments
1 minute identification	Real time	As close as possible to Notification.
10 minute characterization	Real time	Within 10min of identification.
15 min updates (ongoing)	Simulated time	Every 15min from characterization through to characterization + 12 hours (simulated time). Teams may choose to batch upload this, however, consideration must be given to the useability of the data, not inundating a fire manager.

On receiving a Notification, teams are to scan historical data for the time and location in question. Teams should then identify any points of ignition with a view to observing and characterising all potential fires in the location provided. Teams should provide this information in response as quickly as possible following the Notification. Speed in response to Notifications will be a judged criteria, however, accuracy of ignition time and location is more important.

The initial response to a Notification should be as close as possible to the Notification, thereby addressing the Data Capture Time criteria. Once this initial response has been delivered by

teams, ongoing 10 and 15 minute updates need not be in real time, but simulated. This means that, once ignition has been identified, teams should provide behavioral and growth characteristics based on the 'simulated' time. Teams may aspire to provide analysis in a sub-15 minute resolution, if their system allows this.

Sample Scenario: N1 is the earliest and coarsest Notification; a team may be able to identify all fires within the target area and location including characteristics such as ignition time, intensity, behavior and spread based solely on N1. This may, however, produce a volume of data that may be difficult for a fire manager to interpret and action.

On the contrary, N5 is the latest and most refined Notification. N5 will narrow the target to an unambiguous time and location, for which teams should be able to identify the same characteristics. This will naturally produce less data for a fire manager to wade through, however, it will take longer (in real-time) to arrive at this endpoint.

Instead of responding immediately to N1 or waiting for N5, teams may use N1 to identify all fires, then refine down—potentially with increasing intelligence—their observations as N2, N3, N4 and N5 arrive. Of note, teams may respond to each Notification more than once, this may be a continual process. Once a team has identified a fire within a target, they need to provide 12 *simulated* hours of observation, analysis and characterization, and this could feasibly be achieved in a single delivery response. This could occur in a very short *real-time* period, and does not need to be sustained for the entire 12h STV window.

In this scenario, it is up to individual teams to trade these aspects off. Each team's system is different and the timing aspect of STV is designed to pursue innovations, whilst accommodating as many teams as possible.

Of note: XPRIZE is conscious that STV is an artificial environment. Reporting time in STV, using historical data, may vary from the reporting time for live fires used in Round 3. The combination of Developmental Check-ins and STV give judges a level of confidence of success in Finals, teams should seek to optimize this.

1.6. Test Logistics

Date & Time

Semifinals System Technical Verification is currently scheduled for April 2025. Exact testing dates and assigned testing times will be announced to teams by March 1, 2025.

Location

Semifinals STV will be conducted as a remote/virtual activity. XPRIZE does not envisage a need for teams to be physically colocated with judges for STV, however, XPRIZE reserves the right to have a representative, judge or other designated individual(s) visit teams in-person and or virtually during the testing window. Advanced notice will be provided prior to visit.

Teams may choose to colocate based on their individual composition or system requirements, but this is at the discretion of each competing team.

The XPRIZE Wildfire Operations Team will be colocated in order to standardize test conduct, scoring and administration.

STV Test Platform

As discussed in Section 1.3, there are three platforms over which STV will be conducted:

- Team's unique platforms
- ArcGIS Velocity (accessed via POST URL only)
- ArcGIS Online

All teams have ArcGIS Online accounts. Direct support from Esri is available for all teams, which will be facilitated by XPRIZE. ArcGIS Velocity and Online functionality for STV will be provided at **no cost** to teams.

1.7. Testing Assumptions and Artificialities

In any testing, assumptions and artificialities may be necessary to complete testing in the time allotted and/or account for logistical limitations. Testing participants should accept that assumptions and artificialities are inherent in any testing, and should not allow these considerations to negatively impact their participation.

Assumptions

Assumptions constitute the implied factual foundation for the Testing and, as such, are assumed to be present before the testing starts. The following assumptions apply to the testing:

1. **Global data.** The locations for observations will be drawn from across the globe. This is done for a variety of reasons but ultimately to ensure that the winning system is truly able to provide global EO wildfire data, aligned with XPRIZE's vision and that of supporting sponsors.
2. **Live Fire Behavior Intelligence:** While critical to informing action, fire behavior cannot be measured accurately in real-time and is estimated on-site by wildland firefighters. Teams will generate a comprehensive characterization of fire behavior including perimeter, direction and rate of spread, and intensity in different parts of the fire.
3. **High-Resolution Detection:** Current fires visible from space are too large for effective response. Teams will demonstrate the ability to detect fires 10m² in size and smaller, toward 1m², while drastically cutting the false positives rate to 5%.
4. **Atmospheric conditions.** Wildfires involve inherently complex weather patterns. The selected EO locations may contain smoke and clouds. Post-ignition, fire-generated thunderstorms and pyrocumulonimbus clouds may obstruct direct observation of wildfires. Teams should expect and prepare for complex atmospheric conditions to be

- present in the historical data. In addition to pure atmospheric, teams should reasonably expect targets to be drawn from all times of day, including day and night observations.
5. **Complex terrain.** Wildfires are prevalent in areas with steep terrain and dense vegetation. These characteristics inherently complicate the ability to directly observe ignition and fire behavior. Teams should expect and prepare for complex terrain to be present during EO.
 6. **Terrestrial communications.** Due to the sheer number of fire agencies across the world, it is extremely challenging to standardize communications systems, and impractical to impose a single terrestrial communications system on all agencies. In order to reduce complexity and to standardize competition outputs, the boundary of Semifinals is deemed to be the delivery of data to an XPRIZE portal. This may be achieved through direct integration with the portal or by proprietary API. XPRIZE assumes that delivery to this portal represents the final practical stage at which communications protocols can reasonably be assumed to be standardized.
 7. **False positives.** False positive readings (the misidentification of a hot object or surface as a fire) detract from current EO systems. False positives may result in misdirected resourcing (deploying firefighters to a rooftop solar panel) or the over-analysis of such an observation by a dispatch center. Reducing false positives contributes to the efficient use of resources by fire agencies. Teams should expect and prepare for false positives to be present during EO.
 8. **Near Real-Time Data:** Wildfire observation is inherently time-critical. Teams should anticipate the realities of space-based EO and plan accordingly.
 9. **Esri integration.** Prior to STV, teams will be empowered to liaise with Esri in order to develop the necessary API or other integration method. XPRIZE assumes that at the commencement of STV, teams are fully integrated with Esri and that technical support during testing is not required.
 10. **Notification of Targets.** The targets consist of two facets: temporal (when) data, and location (where) data. For each serial, numerous notifications will be issued, known as “N”. Each notification refines temporal and location data for the observations in question, however, teams should not wait for all notifications to occur to commence analytics and reporting.

Artificialities

The Semifinals System Technical Verification does not include an outdoor live fire test. Instead, this competition milestone relies on historical fires to challenge the analytical capabilities of teams. Some of the data, including EO data, used for STV is already available. The design of the STV acknowledges this as a constraint, and challenges teams to provide step-change improvements to analytics. To be explicit, this artificiality means that XPRIZE will be expecting to see better interpolation, accuracy, precision and modelling of fires. XPRIZE expects that data will be faster and more usable for fire managers, as this is where the user community will see tangible improvements to the status quo.

1.8.

1.9. Test End State

The testing end state is to ensure that the teams' solutions have the necessary tools, methods, and procedures that can effectively process, arrange, and scrutinize EO data to obtain and share crucial wildland fire insights.

1.10. Preparing for Testing

Teams should keep in mind the following points while preparing for the STV:

1. **XPRIZE will not provide any EO data during testing.** EO data can be sourced from any applicable and legal EO source. The STV is designed to prepare teams for the Competition Finals, where teams are responsible for their own EO data. For the purpose of focusing on analytics, teams have access to the same suite of publicly and professionally available EO data.
2. Teams must ultimately show proof that all the testing data they analyzed must be from space (100km+).
3. Teams should expect and prepare for real-world EO challenges, such as weather conditions (lighting, shadowing, time of day, smoke, clouds, and temperatures), land conditions (different terrains and landscapes), different fuel types, and false positives.
4. **To repeat, the locations used for STV observations will be drawn from around the world.**
5. The STV is a simulation of a real-time environment. Teams will be asked to deliver data at 1 minute (initial observation), 10 minutes (initial characterization) and 15 minute updates throughout the test window. These timings are representative of real-world timing sought by fire agencies worldwide.

– End of Test Plan –

2. Rules and Regulations

2.1. Earth Observation Data Rules

The following rules constrain the source data types. The rules are established to provide realism for all teams and to enable fair and equitable judging.

Rule 1 Observation from Space	
Description	Observations of wildfires shall be made from Space. Of note, Space is defined as an altitude of 100km above sea level (the Kármán line) or greater.
Rationale	Earth Observation data could potentially be obtained from any altitude. XPRIZE (and partners) has identified that a major gap in global capability exists in low-latency, high accuracy space-based wildfire detection. To be explicit, HAPS, HALE, or other platforms obtaining EO data from lower than 100 km are excluded. Teams may use any EO data in order to train their systems prior to STV, but such data cannot be used during STV testing.

Rule 2 Legally-sourced data	
Description	Earth Observation data shall be received legally and with the knowledge and permission of the source of the EO data.
Rationale	<p>Whatever method teams select to source their EO data, the source of this data must know and give permission for this data to be used for this competition. No team is to hack or otherwise obtain data unknowingly from 3rd party sources.</p> <p>Failure to adhere to this code of conduct would be a violation of the Competitor Agreement. Teams should refer to the Competitor Agreement section 11.1.5 and Guidelines section 5.</p>

Rule 3 Declaration of EO Sources	
Description	Teams must declare their EO data sources in their STV submissions
Rationale	<p>When delivering analytic results of their observed targets, teams must openly declare what sources were used to reach these findings.</p> <p>Information to be provided must contain, but is not limited to: name of the satellite/spacecraft, altitude at time of observation, payload type, spectral information including resolution and range, spatial information (pixel element size), radiometric information including last known calibration.</p>

2.2. Integration Rules

For the purpose of data transfer and sharing during STV, teams will be required to integrate with the [Esri ArcGIS Velocity](#) platform and this will be achieved via a POST URL (see Rule 9). Teams will be provided ample opportunity to scope, assess and integrate their systems with Velocity (mandatory) and ArcGIS Online (optional). The integration with the Velocity platform places a light onus of integration on the team, however, it does so in a fair and equitable manner.

When addressing Integration Rules, teams should maintain focus on end-user usability of data. Teams should endeavor to provide user-friendly intelligence; post-processing of data by the end-user is suboptimal and this will be reflected negatively in scoring.

Rule 4 XPRIZE-Provided Testing Platform	
Description	<p>All teams shall POST to the Esri ArcGIS Velocity platform via URL during STV for the purpose of baseline observation reporting.</p> <p>Submissions to this URL are to be in accordance with the Data Dictionary contained as an attachment to these Rules & Regulations.</p>
Rationale	<p>Esri ArcGIS Velocity allows teams to ingest data via API and analyze real-time feeds. Teams are encouraged to familiarise themselves with Velocity and ArcGIS Online. XPRIZE, via Esri, will provide a common level of support to teams.</p> <p>If teams are using manual downloads, emails, SMS or any form of push notification, they are responsible for providing XPRIZE with the relevant destination information. For example, if a team is using email push notifications, that team is responsible for providing XPRIZE with the email distribution list that XPRIZE needs to sign up to.</p> <p>In addition to ArcGIS Velocity and Online, teams may choose to use their own analytic and reporting solution, to which XPRIZE must be able to see and use for the purpose of judging.</p> <p>Teams may submit data products in both or either raster or vector files, including multidimensional data. XPRIZE and Esri will equally assist all teams with integration, within reason and as defined by XPRIZE and testing partners to ensure fairness. Teams are ultimately responsible for integration with ArcGIS, as this is an industry standard platform for EO and geospatial data dissemination.</p>

Rule 5 End-user format	
Description	<p>Processed data (intelligence) shall be output by the competing team in an Open Geospatial Consortium (OGC) format.</p>
Rationale	<p>OGC file types are effectively the global standard in EO data and are used by fire</p>

	<p>and emergency management agencies broadly. Teams may choose to adjunct their data with information in other formats, however, submissions will be primarily assessed on GIS data.</p> <p>All reporting is to use the International System of Units (SI) units. The SI comprises a coherent system of units of measurement starting with seven base units, which are the second (symbol s, the unit of time), metre (m, length), kilogram (kg, mass), ampere (A, electric current), kelvin (K, thermodynamic temperature), mole (mol, amount of substance), and candela (cd, luminous intensity).</p> <p>Ultimately the intelligence gathered by competing systems will be used by firefighters on a fireground. Teams should remain cognisant of this operational context throughout.</p> <p>Definition of OGC formats is available at https://www.ogc.org/standards/</p>
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Rule 6 Provision of API	
Description	Where required, each team is responsible for providing and integrating their API with the Esri ArcGIS Velocity (Rule 4).
Rationale	<p>XPRIZE is providing a testing platform as a common platform for all teams to use. For some teams, this may require integration through the use of an API to ensure compatibility. Where this is required, this is the responsibility of the team to design and implement.</p> <p>XPRIZE and Esri may assist if required, however API design is the responsibility of the individual team.</p>

2.3. Timings and Reporting Rules

Teams will be given numerous notifications during STV, known as “N”. Each notification provides increased fidelity on the location and timing of required observation(s). The rationale is to continually refine observations, with the end result being tabulated analysis that can be compared and assessed. Teams are required to provide identification, characterization and ongoing updates for the fires in their observations.

The information required here by these Rules is the minimum standard. Teams are encouraged to exploit and promote their abilities within the provided platform to uplift the intelligence available to fire managers. Reporting that is in addition to the minimum information should value-add.

The primary change in Rules v1.1 is that Velocity is mandatory (accessed via POST URL), and ArcGIS Online is optional. The .csv from v1.0 is replaced here with a data schema courtesy of Esri (see Rule 9).

Rule 7 Identification	
Description	Teams shall detect all fires within the defined target area.
Rationale	<p>Fire location(s) and behavior (size, intensity, rate of spread, etc.) will be known to XPRIZE to aid verification and validation. Teams must provide the most accurate time and location of initial ignition possible.</p> <p>Teams are reminded of the Competition Guidelines whereby they have one minute to identify fires. Teams will be scored based on the accuracy of their initial detection of fires.</p> <p>The only mandatory requirement here is to identify the fire(s) while minimizing false positive reporting. Any additional information provided (for example, early characterization) will be treated as enhancing characteristics of the team's submission.</p>

Rule 8 Test window is maximum 12 hours	
Description	Each team shall have a test window of twelve hours (real-time).
Rationale	<p>12 hours is representative of a typical fireground operational planning period. Teams will be required to continuously monitor all data feeds during this period.</p> <p>XPRIZE will ensure that all teams have a reasonable time in which to deliver all observations required, whilst demonstrating the capabilities of their system. The exact duration of the test window may be influenced by the data processing times and delivery to the XPRIZE portal by teams' systems. Once the test window closes teams will no longer have access to their data stored on the Esri platform. XPRIZE will take all reasonable steps to ensure teams have sufficient and appropriate time to provide insights for all test serials.</p>

Rule 9 Reporting	
Description	<p>Teams shall submit their observation data to a POST URL. This URL is the front-end to Velocity and exact details will be provided in due course. Language used is GeoJSON.</p> <p>The schema for this POST will be promulgated prior to the Test Procedures. It will</p>

	<p>include, but not be limited to:</p> <ul style="list-style-type: none"> • Time (UTC and local) of observation • Location (latitude and longitude) of observation • Characterization of observation, for example direction and rate of spread, intensity.
Rationale	<p>The data required here is the bare minimum. Use of this POST data is to ensure a baseline for comparison by judges, but additional material is welcome and may be transmitted via ArcGIS Online or by teams' individual solutions or platform(s).</p> <p>Teams are strongly encouraged to include observed fire behavior (direction, rate, perimeter, etc.) and also encouraged to include predictive behavior.</p> <p>Teams are strongly encouraged to consider the types of data and the level of fidelity that is of most use to on-ground fire managers. Teams should consider what information should be delivered immediately, versus what can be delivered later for greater effect. Consideration should be given to reporting on aspects such as access routes, water sources, key infrastructure, obstacles and hazards, command and control considerations, forecast growth rates and patterns, terrain, fuel types and loads, current and future weather conditions and any other detail that may assist but not overwhelm fire management staff.</p>

2.4. Administrative Rules

Rule 10 Safety	
Description	Teams must comply with local occupational health and safety (or equivalent) regulations and laws in their jurisdiction.
Rationale	Operational health and safety is a fundamental consideration within this competition. Teams are responsible for operating safely and in compliance with local, regional and national occupational health and safety regulations and laws. Despite STV being a primarily online activity, teams must comply with applicable regulations and laws.

Rule 11 Cooperation with XPRIZE Wildfire	
Description	Teams must cooperate with the XPRIZE Foundation and any official partner or representative to facilitate the conduct and verification of STV.
Rationale	<p>By entering into STV, teams acknowledge that communications and cooperation are fundamental to the conduct of a successful STV. XPRIZE may request information from teams directly, including cooperation with scheduling and logistic planning and provision of requested technical details and performance or analytic data.</p> <p>XPRIZE will make every effort to cooperate with STV teams, communicate</p>

	proactively and accommodate each team’s specific circumstances within reason. XPRIZE reserves the right to disqualify teams for lack of cooperation during this process as per the Competitor Agreement.
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Rule 12 Developmental Check-ins	
Description	Teams must complete all Developmental Check-ins in the lead-up to STV conduct.
Rationale	<p>A Developmental Check-in is a scheduled event where teams are required to submit updates on their progress in designing their technological systems. Examples of information teams may be asked to submit during check-ins include pictures, drawings, videos, narrative reports, proof of regulatory licensing and other applicable materials. Teams will be allowed ample time to prepare submission materials.</p> <p>XPRIZE Wildfire inherently involves TRL uplift from QTS through to Round 3 Finals. In order to provide assurance that teams maintain a competitive trajectory between QTS and STV, XPRIZE uses Developmental Check-ins. These submissions will be delivered via XPRIZE’s Prize Operations Portal (POP) where teams will be asked specific questions regarding the development of their systems.</p> <p>Whilst Developmental Check-ins are not scored, they will be used by judges to provide a level of confidence that the team is uplifting and on a trajectory to empower success in Round 3 Finals. As such, judges may use Check-ins to assess the viability of teams to continue competing at any stage.</p>

Rule 13 Business Plan	
Description	Teams must complete a business plan in accordance with the XPRIZE-provided format.
Rationale	<p>Fundamental to the XPRIZE design is the ability to scale up prize solutions to contribute to global solutions. In this vein, teams will progressively build their business plan along with Developmental Check-ins.</p> <p>The purpose of the Business Plan is to set up teams for success in delivering a holistic, not just technological, solution to improving space-based EO support to wildfires. XPRIZE will provide teams with direction and guidance in developing this plan and this will be released alongside Developmental check-ins.</p>

3. Selection for Progression to Finals

The nature of STV means that teams will be ranked against each other. There is no minimum standard or cut-off that teams need to achieve to successfully progress through to Round 3 Finals. Despite this, teams should remain cognisant that Finals are a live-fire EO test which requires the integration of analytics with live EO data. Where STV is about the ability and capacity to quickly analyse largely existing data, Finals require these analytics to perform in real-time. Teams should use STV to demonstrate the full capabilities of their system, highlighting those areas in which your system provides a step-change in capability.

STV provides an assessment of analytic capability of teams' solutions. XPRIZE will use STV results, in concert with Developmental Check-ins, to make determination as to which teams progress to Finals. Only those teams with a chance of success at Finals will be allowed to progress.

3.1. Test Assessment Criteria

Teams will be scored based on the accuracy, precision, and timeliness of their insights. As a guide, teams are reminded of the following metrics, summarized from the Competition Guidelines (Section 3.5) and information provided during QTS:

Rapid Data acquisition	Data Capture Time	Screening¹: Within ≤ 1 min
	Reporting Lag	Screening + Scoring²: ≤ 10 min, points toward (near) real time
	Update	Screening: Every 15 minutes over 12 hours
Accurate Quality of observation and intelligence	Resolution (fire size)	Screening: Detects all fires measuring $\geq 10\text{m}^2$ across the designated area in all tested temporal and environmental conditions. Scoring: Points for the detection of fires $< 10\text{m}^2$, toward 1m^2 .
	Characterize the fire	Scoring: Upon detection, characterize fire behavior: perimeter, direction and rate of spread, and intensity in different parts of the fire. Additional points towards comprehensive Fire Size-Up characterization including access to fire location, surrounding fuels, and values at risk.
	False Positives Rate	Screening + Scoring: $\leq 10\%$ in Semifinals.

¹ Screening criteria have minimum thresholds that must be met and are assessed as 'pass/fail'.

² Scoring criteria are optional to demonstrate for additional points and determine who of all the teams that pass the screening criteria, advance or win.

Precise Location	Pinpoint Location	Screening: Within 1 m ² from the fire, Scoring: Points toward closest to fire
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Judging Panel Roles During Testing

During Testing, Judges will evaluate and score the testing outputs resulting from STV.

Judges will be assigned their roles at XPRIZE’s discretion. Teams may not request a particular Judge and will not know ahead of time which Judge is acting in what role at testing.

Judges’ Decisions

Judging decisions are final. Judges are prohibited from providing feedback to Teams. Teams may not contact Judges outside of XPRIZE-managed circumstances. XPRIZE does not interfere with the Judges’ deliberations or decisions in any way. Judges are required to recuse themselves for any reason that might compromise the impartiality of their deliberations or decisions.

In some instances, the Judging Panel may require additional information from Teams and XPRIZE will facilitate these discussions as necessary. The Judging Panel retains ultimate discretion to declare the winners of the Competition and otherwise award all Prizes (subject to the Competitor Agreement). All judging decisions and opinions made by the Judging Panel are binding on both Teams and XPRIZE, and are not subject to review or contest. No judging decision may be challenged by a Team, and all Teams agree to abide by and refrain from any such challenge.

—END OF RULES AND REGULATIONS—

Track A: Space-Based Detection and Intelligence

Round 2: Semifinals System Technical Verification

Data Dictionary

Teams may submit either Point or Polygons, the dictionaries for each are outlined on subsequent pages. Submissions must be in GeoJSON, sample script is contained herein for clarity.

Point Submissions

Field Name	Field Type	Description
obsdatelocal	date	Timestamp of observation in local time. Format should be as follows: YYYY-MM-DDTHH:mm:ss
obsdateutc	date	Timestamp of observation in UTC. Format should be as follows: YYYY-MM-DDTHH:mm:ss
uniquetargetid	string	<i>teamname</i> is to be consistent with the team's Group name created on ArcGIS Online (eg BC_WildfireA_teamname_Prod). <i>targetid</i> is a unique identifier for each observed target, this is to be determined by each team.
frp	float	Fire Radiative Power, measured in Watts.

Point Submissions - Sample GeoJSON Script

```
{
  "type": "FeatureCollection",
  "features": [
    {
      "type": "Feature",
      "properties": {
        "obsdatelocal": "2024-10-30T11:24:56",
        "obsdateutc": "2024-10-30T06:24:56",
        "uniquetargetid": "BC_WildfireA_Team1_Prod",
        "frp": 20045.2
      },
      "geometry": {
        "coordinates": [
          144.96973745558864,
          -37.8506497553798
        ],
        "type": "Point"
      },
      "id": 0
    }
  ]
}
```

Polygon Submissions

Field Name	Field Type	Description
obsdatelocal	date	Timestamp of observation in local time. Format should be as follows: YYYY-MM-DDTHH:mm:ss
obsdateutc	date	Timestamp of observation in UTC. Format should be as follows: YYYY-MM-DDTHH:mm:ss
teamname_targetid	string	<i>teamname</i> is to be consistent with the team's Group name created on ArcGIS Online (eg BC_WildfireA_teamname_Prod). <i>targetid</i> is a unique identifier for each observed target, this is to be determined by each team.
burnedarea	float	Size of observed burned area (in square kilometers).
obsdirection_n	integer	0 or 1 (no or yes) value to determine if the observation is spreading <u>n</u> orth.
obsdirection_e	integer	0 or 1 (no or yes) value to determine if the observation is spreading <u>e</u> ast.
obsdirection_s	integer	0 or 1 (no or yes) value to determine if the observation is spreading <u>s</u> outh.
obsdirection_w	integer	0 or 1 (no or yes) value to determine if the observation is spreading <u>w</u> est.
rateofspread_n	float	Northerly rate of spread of the observation in m/min (meters per min.)
rateofspread_e	float	Easterly rate of spread of the observation in m/min (meters per min.)
rateofspread_s	float	Southerly rate of spread of the observation in m/min (meters per min.)
rateofspread_w	float	Westerly rate of spread of the observation in m/min (meters per min.)
intensity	float	Intensity of observation in kW/m (kilowatts per meter)

Polygon Submissions - Sample GeoJSON Script

```
{
  "type": "FeatureCollection",
  "features": [
    {
      "type": "Feature",
      "properties": {
        "obsdatelocal": "2024-10-30T11:24:56",
        "obsdateutc": "2024-10-30T06:24:56",
        "uniquetargetid": "BC_WildfireA_Team1_Prod",
        "burnedarea": 2945.08,
        "obsdirection_n": 0,
        "obsdirection_s": 1,
        "obsdirection_e": 0,
        "obsdirection_w": 1,
        "rateofspread_n": 0,
        "rateofspread_s": 1,
        "rateofspread_e": 0,
        "rateofspread_w": 1,
        "intensity": 35.35
      },
      "geometry": {
        "coordinates": [
          [
            [
              144.95954467969614,
              -37.841917240302685
            ],
            [
              144.96112685545097,
              -37.84464300721443
            ],
            [
              144.96438155545928,
              -37.848477676551106
            ],
            [
              144.97599659089803,
              -37.85786031824919
            ],
            [
              144.95954467969614,
              -37.841917240302685
            ]
          ]
        ]
      }
    }
  ]
}
```

```

    [
      144.9776308893547,
      -37.85942684960777
    ],
    [
      144.98222701561195,
      -37.8557429706511
    ],
    [
      144.9729853802241,
      -37.836187808031134
    ],
    [
      144.96777312887576,
      -37.837333535502744
    ],
    [
      144.95954467969614,
      -37.841917240302685
    ]
  ]
  ],
  "type": "Polygon"
},
"id": 0
}
]
}

```