






This page hosts links to a variety of ways *FIRST* Robotics Competition® community can experience the DESTINATION: DEEP SPACE Presented By The Boeing Company playing field.

FIRST is so grateful to the supporters that created these assets!

Experience deep space...

- [through video](#)
- [on your computer](#)
- [on your mobile device](#)
- [with a VR headset](#)
- [with your own scale model](#)
- [in 2 dimensions](#)

[Jump to details here.](#)

						
... through video		<p>Game Animation</p> <p>see the field in the context of how the game plays</p>	<p>Drone Footage</p> <p>brief aerial video of the field</p> <p>Field Tour Videos</p> <p>details of the field in a series of short, live-action videos</p>			
... on your computer	<p>Simulation</p> <p>import your robot model and simulate your code</p>		<p>Official CAD Models</p> <p>download the <i>FIRST</i> CAD models</p>	<p>Photoreal Imagery</p> <p>explore a detailed photo scan of a live field</p>		<p>Virtual Field 360VR</p> <p>explore a photoreal CAD field model</p> <p>Measure It</p> <p>check field point to point field dimensions</p> <p>Virtual Field 360VR</p> <p>explore a photoreal CAD field model</p>
				<p>Photoreal Imagery</p> <p>see a virtual field on your table top</p>	<p>Scale VR Model</p>	

<p>... on your mobile device</p> <p>(and perhaps with your Siemens cardboard viewer)</p> <p>SIEMENS</p>				<p>explore a detailed scan of a live field</p>	<p>or in your parking lot</p>	
<p>... with a VR headset</p>		<p><u>HTC Vive & Oculus Rift</u></p> <p>immerse yourself in deep space</p>		<p><u>Microsoft Hololens</u></p> <p>immerse yourself in deep space</p>		<p><u>HTC Vive & Oculus Rift</u></p> <p>immerse yourself in deep space</p>
<p>... with your own scale model</p>		<p><u>3D Print</u></p> <p>download files to 3D print a 20:1 scale field</p>		<p><u>WPI's Photo Album</u></p> <p>browse photographs of the field</p>	<p><u>NASA's Photo Album</u></p> <p>browse photographs of the field</p>	

...in 2 dimensions

**Official Field
Drawings**

download the
full drawing
package

Automation Direct's 3D Printable Field

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Description: AutomationDirect's animation team converted the animation models into 3D printable models, 20:1, for you. This is the "playing field" for the *FIRST* Robotics Challenge (FRC) game for 2019. These models are not intended to be accurate representations of the actual field – please do not use them for ANY game, rule or 'build' decisions. These models have been highly modified from the actual field drawings to make them easy to 3D print and assemble and to give the general appearance of the actual field. All parts should fit together, but that depends heavily on printer accuracy. Hopefully, they are close enough that you can file things down a little if needed.

Files are organized in three batches: one batch with components used from season to season, a second batch with components specific to the 2019 season, and a third batch with the robots from the 2019 animation.

To paraphrase from the Latin – Caveat Printor! Let the printer beware!

More Info:

Prerequisites

- Computer (at least to download and extract zipped files)
- 3D Printer (developers use a low-end RepRap 3D Printer, so any printer you have should be able to print at least as well)

	- Filament (developers used PLA)
PreKickoff Prep	Download last year's field to test using this link (link automatically downloads)
On/After Kickoff Use	Download from this page (link may automatically download)
Hardware Platform	n/a
Offline Use	Yes
Content Source	FIRST official CAD models via animation models
Download Size	~1MB
Open Source	Yes
Interactivity	Yes
Multi-user	Yes

Automation Direct's Game Animation

[\(back up to table\)](#)

Detailed Description:

Enjoy the official game animation for the 2019 *FIRST* Robotics Competition game, DESTINATION: DEEP SPACE Presented By The Boeing Company come Saturday, January 5, 2019.

The purpose of this video is to show the intent of the game, not to replace, supersede the official manual, drawings, or other *FIRST* official assets.

Got animation skills? Want to learn? Check out the Digital Animation Award competition [here](#).

More Info:

Prerequisites	Web browser
PreKickoff Prep	View the 2018 game animation here .
On/After Kickoff Use	View the 2019 game animation here .
Hardware Platform	Computer or mobile device
Offline Use	Yes
Content Source	Official <i>FIRST</i> CAD models
Download Size	n/a
Open Source	No
Interactivity	No

Multi-user	No
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AutomationDirect's HTC Vive & Oculus Rift

[\(back up to table\)](#)

Description: Enjoy immersing yourself in the 2019 field. Explore all aspects of the field and interact with game elements.

Interested in the source files? Download them [here](#) (caution, very large file, ~6GB)

More Info:

Prerequisites	<ul style="list-style-type: none"> • Oculus Rift, • HTC Vive, or • HTC Vive Pro <p>Note: Oculus Go or Gear VR won't support the full VR experience, but users <i>can</i> but users <i>can</i> use them to get fully immersed in the 360 degree images and videos. Oculus Quest is TBD, but it'll <i>probably</i> work</p>
PreKickoff Prep	Try the VR field they published for the 2018 season. Details are here .
On/After Kickoff Use	Find information here (recommended, updated 1/25/19) or download directly using this link (updated 1/25/19)
Hardware Platform	See "Prerequisites"
Offline Use	Yes
Content Source	FIRST official CAD models
Download Size	~670MB
Open Source	Yes
Interactivity	Navigate the model, interact with game elements

Multi-user	Yes
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FIRST Drone Footage

[\(back up to table\)](#)

See drone footage of the 2019 field used for Kickoff filming.

- [Video 1](#)
- [Video 2](#)
- [Video 3](#)
- [Video 4](#)

More Info:

Hardware Platform	Internet capable computer
Offline Use	n/a
Content Source	<i>FIRST</i> official live field
Download Size	n/a
Open Source	No
Interactivity	No
Multi-user	No

FIRST Official Field Drawings

[\(back up to table\)](#)

Description: Peruse 2-dimensional drawings created from the official *FIRST* CAD models.

Note, unless otherwise indicated, links may automatically download.

- Team Drawings (drawings of wooden mockups of major field elements)
 - [2019 Team Element Shopping List](#) (list of the materials needed to build wooden elements of the 2019 game - there are two versions: one to build a 1/2 field, one to build a reduced build that should still cover the basics)
 - Full field (updated 2/1/19)
 - [Drawings](#) only
 - [Zip of drawings + CAD + DXF + Read Me](#) (~68MB)
 - Half field (updated 2/1/19)
 - [Drawings](#) only
 - [Zip of drawings + CAD + DXF + Read Me](#) (~33MB)
 - Reduced field (just the basics, updated 2/1/19)
 - [Drawings](#) only
 - [Zip of drawings + CAD + DXF + Read Me](#) (~37MB)
- [Field Drawings – season specific](#) (~17.5 MB, updated 2/19/19)
- [Field Drawings - evergreen](#) (~5 MB)
- [Layout and Marking Diagram](#) (~1.4 MB, updated 1/8/19)

More Info:

Hardware Platform	Computer or mobile device
Offline Use	Yes
Content Source	<i>FIRST</i> official live field
Download Size	Varies, see above
Open Source	No
Interactivity	Zoom
Multi-user	No

***FIRST* Official CAD Models**

[\(back up to table\)](#)

Description: 3-dimensional models of field parts and assemblies. Modeled in SOLIDWORKS.

Note, links may automatically download.

To open the 2019 SOLIDWORKS CAD model versions posted by *FIRST*, you must have SOLIDWORKS 2018. Visit the [SOLIDWORKS section of the Virtual Kit of Parts](#) webpage to get details.

Access CAD Files [here](#) (updated 2/19/19).

More Info:

Hardware Platform	Computer
Offline Use	Yes
Content Source	<i>FIRST</i> official CAD models
Download Size	~273 MB
Open Source	No
Interactivity	Zoom
Multi-user	No

Microsoft Hololens by NASA

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Detailed Description: Explorable full-scale AR/VR models of an official live field in which users can enjoy simultaneous collaborative experiences, dynamic object simulation, and co-registered model viewing.

More Info:

Prerequisites	HoloLens
PreKickoff Prep	n/a
On/After Kickoff Use	<i>Pending</i>
Hardware Platform	Microsoft Hololens
Offline Use	Yes
Content Source	NASA's photoreal scan of a live field
Download Size	TBD
Open Source	No
Interactivity	Manipulate game pieces, move around the space

Multi-user	Yes
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NASA's Photoreal Imagery

[\(back up to table\)](#)

Detailed Description: Virtually explore (pan and zoom) a 360°, high-resolution image of a field in a web app. You can also view the field using a stand alone app on a smartphone (including download and view offline). The user can view the field at full scale. *(updated 1/25/19)*

Note: Not all Web browsers support viewing 360-degree videos and images. Best viewed in Google Chrome.

More Info:

Prerequisites	- Computer or - Android Device with <ul style="list-style-type: none">• internet access,• the NASA RAP FRC Field Viewer app installed (Apple device support pending), and• a cardboard VR viewer
PreKickoff Prep	n/a
On/After Kickoff Use	Click here for web viewer experience.

	For mobile use, launch app on your phone and put your phone in a viewer.
Hardware Platform	Computer or Android Device (Apple devices pending)
Offline Use	Web app: No
	Smartphone app: Yes
Content Source	NASA's photoreal scan of a live official field
Download Size	n/a
Open Source	No
Interactivity	Pan, Zoom
Multi-user	No

Photo Albums

[\(back up to table\)](#)

Download photos taken by Brad Miller of WPI of a live 2019 field [here](#) (may automatically download folder).

More Info:

PreKickoff Prep	See his photos from the 2018 season here (automatically downloads a 440 MB folder).
Hardware Platform	Computer or mobile device
Offline Use	Yes
Content Source	<i>FIRST</i> official live field
Download Size	~340 MB
Open Source	No
Interactive	Zoom
Multi-user	No

Download photos taken by Dave Lavery of NASA of a live 2019 field [here](#) (may automatically download folder).

More Info:

Hardware Platform	Computer or mobile device
Offline Use	Yes
Content Source	<i>FIRST</i> official live field
Download Size	~1.3GB
Open Source	No
Interactive	Zoom
Multi-user	No

PTC's Scalable Model

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vuforia™

Description: Use the Vuforia mobile device platform, compatible with Android/iOS, to view the 2019 field at a scale convenient for your circumstances. You can use your mobile device by itself or use it in a viewer like Siemens' cardboard.

- Visualize the field at different scales: for example, table top size or full room size, anchored in the room so you can walk around it and inspect it.
- Visualize and animate the props on the field
- See augmented information, i.e. hot spots, that supplements the field viewing experience

Other Info:

Prerequisites	- Mobile device with the Vuforia app installed.
PreKickoff Prep	- Cardboard viewer (optional) <ol style="list-style-type: none"> 1. Download the Vuforia app for iOS or Android 2. Print the Vumark 3. Launch the app and use your devices camera to scan the Vumark
On/After Kickoff Use	<ol style="list-style-type: none"> 1. Download the Vuforia app for iOS or Android 2. Print the Vumark 3. Launch the app and use your devices camera to scan the VuMark (updated 1/8/19)
Hardware Platform	Mobile device, cardboard capable
Offline Use	Yes
Content Source	<i>FIRST</i> official CAD models
Download Size	TBD
Open Source	No
Interactive	Zoom
Multi-user	No

SOLIDWORKS' eDrawings Measurement

[\(back up to table\)](#)



Description: Be the first to get a sneak peak of a new feature coming to eDrawings. Easily measure any aspect of the field virtually using any device. All you need is the link (below)!

*Note – This experience is pre-release functionality. A current known issue is slow loading time of the field model which may require clicking through a browser time out warning multiple times. If this happens, be patient, click through the browser warnings and it will load.

About eDrawings: eDrawings is a product design communication tool for sharing representations of both 2D drawings and 3D models. The data format of eDrawings files is highly compressed to enable easy transmission via email. When viewed with the eDrawings Viewer, these files provide intelligent interpretation tools (3D Pointer, Virtual Folding, Animated Drawing Views) that help the recipient easily understand and navigate the data they receive. eDrawings files may be sent to anyone via email. To eliminate the frustrations normally associated with 2D and 3D design data, the viewer may be embedded directly in an eDrawings file. These files can immediately be viewed by anyone with a Windows operating system and now the browser. No additional CAD software or viewers are required.

(eDrawings content above updated 12/26/18)

To get SOLIDWORKS software, apply for sponsorship at <http://www.solidworks.com/FIRST>.

More Info:

Prerequisites	<p>- Computer</p> <ul style="list-style-type: none">• Windows 10, 64-bit• Windows 8.1, 64-bit• Windows 7 SP1, 64-bit• Mac 10.12• Mac 10.11• Mac 10.10 <p>or</p>
PreKickoff Prep for use on a computer	<p>- Mobile Device</p> <ol style="list-style-type: none">1. Download the eDrawings Viewer from here and Install.2. Download last season's <i>FIRST</i> official CAD model here (link will automatically download) and unzip the folder.3. Launch the eDrawings application and Open your preferred model (to explore the complete <i>FIRST</i> Power UpSM field, open file FE-00041).

PreKickoff Prep for use on a mobile device	Click this link to see an MG sports car example (or try any model on 3D Content Central) for a comparable experience to test your system.
On/After Kickoff use on a computer	<ol style="list-style-type: none"> 1. If you haven't already, download the eDrawings Viewer from here and Install. 2. Download this season's <i>FIRST</i> official CAD model here (link may automatically download) and unzip the folder. 3. Launch the eDrawings application and Open your preferred model (to explore the complete DESTINATION: DEEP SPACE field, open FE-00042).
On/After Kickoff use on a mobile device or with a web browser	Click this link . <i>Note: There's a known bug that may cause a "Page Unresponsive" message with an option to Wait or Exit the page. Just click "Wait" (you may have to do this a few times while the model loads for the first time - once it is loaded and cached locally, it should load much quicker). Like they always say, good VR comes to those who wait.</i>
Hardware Platform	Computer or Mobile Device Yes if installed.
Offline Use	No if using eDrawings webGL
Content Source	<i>FIRST</i> official CAD models Software Installer: ~186MB
Download Size	Field Folder: ~273MB
Open Source	No
Interactivity	Pan, tilt, zoom, point to point measure
Multi-user	No

SOLIDWORKS' Visualize 360 VR

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SOLIDWORKS *Visualize*

Description: Explore multiple hotspots of the virtual field with high-resolution, 360° VR images, in a web browser or on mobile devices.

Note: Not all Web browsers support viewing 360-degree videos and images. Best viewed in Google Chrome.

To get SOLIDWORKS software, apply for sponsorship at <http://www.solidworks.com/FIRST>.

More Info:

Prerequisites	- Computer using browser or with a connected VR HMD such as HTC Vive, Oculus Rift, Windows Mixed Reality etc. or - Mobile Device with internet access or - Mobile Device with internet access and VR goggle viewer (like Siemens' cardboard)
PreKickoff Prep	See an example of a guided tour here .
On/After Kickoff Use	<ol style="list-style-type: none">1. Click the links below to access associated content:<ul style="list-style-type: none">o Hotspot touro 360 Walkthrough on Primuso 360 Walkthrough in a warehouse2. To view in VR stereo, click the VR goggle icon in the web viewer and put phone in headset.

Hardware Platform	Computer, Mobile Device, or VR Headset
Offline Use	No
Content Source	<i>FIRST</i> official CAD models
Download Size	n/a
Open Source	No
Interactivity	Pan, Zoom
Multi-user	No
Multi-user	No

SOLIDWORKS: SimInsights VR Field Training Experience powered by the SOLIDWORKS XR Exporter

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Detailed Description: Virtually tour and learn about the field and gameplay in a rich experience. Step into the field alone or with team members in a collaborative session and freely roam or interact with learning elements to understand how aspect of the field function and how the gameplay works so you can better prepare for the live environment.

To get SOLIDWORKS software, apply for sponsorship at <http://www.solidworks.com/FIRST>.

Other Info:

Prerequisites	- VR Ready Computer with a connected VR HMD such as HTC Vive, Oculus Rift, Windows Mixed Reality etc. or - Computer with web access and - For the desktop version of HyperMock, users must register and install Steam/SteamVR (download using the button in the top right area of this page). Once installed, right click on the Steam task bar icon and select “SteamVR” to install SteamVR. <i>(bullet added 1/3/19)</i>
PreKickoff Prep	not available
On/After Kickoff Use	<ul style="list-style-type: none">• To view in a browser, click here.• To download the offline, high fidelity experience on a VR Ready computer + VR HMD, click here (link may automatically download) and access its User Guide here.
Hardware Platform	Computer or VR Headset Yes for downloadable version
Offline Use	No for browser version
Content Source	<i>FIRST</i> official CAD models
Download Size	Executable is ~630MB
Open Source	No
Interactivity	Pan, Zoom, Learning Yes for downloadable version
Multi-user	No for browser version

Synthesis: An Autodesk Technology

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Detailed Description: Maximize your DESTINATION: DEEP SPACE build season with Synthesis: An Autodesk Technology, a robotics simulation tool for students. Using CAD models in the simulator, drivers, strategists, and programmers can work simultaneously alongside the build team. Users can test and iterate early and make design changes before it's too late. Synthesis has a minimal learning curve for students to get robots from CAD to a running model within the engine.

- Export any CAD model from Autodesk Fusion360 or Inventor plug-ins as a robot or field. Check out our [opening a step file](#) tutorial if you use another CAD tool.
- Simulate any exported robot model in a custom field environment
- Record real-time physics collisions using Bullet Physics
- Custom mode for driver practice and strategy
- Mix and Match mode for creating custom robot designs
- Customizable controls
- Java and C++ code emulation
- 100% Open Source - - Have an idea for improving Synthesis or are a developer? Visit our [GitHub](#) repository to contribute to our open-source project.
- Field and Robot library available for download

More Info:

Prerequisites

Operating System

- 64-bit Microsoft® Windows® 10 (preferred) Anniversary Update (version 1607 or higher)
- 64-bit Microsoft Windows 8.1
- 64-bit Microsoft Windows 7 SP1 with Update KB4019990

Software (don't forget that Autodesk software is available in the [Virtual Kit of Parts!](#))

- Autodesk Inventor Professional 2016 or later (for Synthesis Robot Exporters)
- Eclipse Photon IDE for Java/C++ development with latest WPilib plugin (for current Synthesis Code Emulator)
- Microsoft Visual Studio Code for Java/C++ development with latest WPilib plugin (Note: This is the official IDE for the FRC 2019 season) (for official IDE for the FRC 2019 season)

CPU

- Recommended: 3.0 GHz or greater, 4 or more cores
- Minimum: 2.5 GHz

Memory

- Recommended: 6 GB RAM or more
- Minimum: 4 GB RAM

Disk Space

- Recommended: Installer plus full installation (2 GB)

Note: The Emulation installer uses QEMU, which will use 600 MB of additional space

Graphics

- Recommended: 4 GB GPU with 106 GB/S Bandwidth and DirectX 11 compliant
- Minimum: 1 GB GPU with 29 GB/S Bandwidth and DirectX 11 compliant

PreKickoff Prep	<ol style="list-style-type: none"> 1. Download Synthesis now and get familiar with all the features. <ul style="list-style-type: none"> ○ Drive Team – Explore field view options and practice driving on previous fields with stock robots or export your own robot models. ○ Programmers- learn how to use the emulator by testing last year’s code or write something new! ○ Strategists – Learn how to use the measuring tool and build instant Mix & Match Robots to test strategy. 2. Check out the Getting Started - Synthesis Video Tutorial Series 3. Check out the Autodesk Education Community for FIRST
On/After Kickoff Use	<p>Immediately after Kickoff, the 2019 field will be available for download on Autodesk's website. You'll just need internet access to grab the field.</p> <p>To install fresh:</p> <ol style="list-style-type: none"> 1. Download Synthesis 2. Check out the Getting Started - Synthesis Video Tutorial Series 3. Check out the Autodesk Education Community for FIRST
Resources	<ul style="list-style-type: none"> ● What is Synthesis? ● Synthesis Video Tutorials ● Synthesis FAQs ● Have a question? A suggestion or a comment? Post to our Forums. ● Visit our YouTube Channel ● Follow our Social Media to stay up to date with announcements and new features <ul style="list-style-type: none"> ○ Twitter ○ Facebook ○ Instagram
Hardware Platform	Computer
Offline Use	Yes
Content Source	FIRST official CAD models
Download Size	232MB
Open Source	Yes
Interactivity	Pan, Zoom, Navigate, Test Code
Multi-user	Yes