

Uploading Project Data to the CPS-VO

CPS-IoT Week Tutorial

A dark blue diagonal gradient bar that starts from the bottom left corner and extends towards the top right corner, covering the bottom half of the slide.

Welcome!

A bit about us

Noelle Sweeney
& Claire McGonigle

Why is uploading
my data to the VO
beneficial?



Example: Dissipation of Stop and Go Waves



The screenshot shows the homepage of the Cyber-Physical Systems Virtual Organization (CPS-VO). The header includes navigation links: CPS-VO, BROWSE, SEARCH, COLLABORATE, MY GROUPS, MY ACCOUNT, and a search bar. The main banner features the CPS-VO logo, a globe with network connections, and the text: "Cyber-Physical Systems Virtual Organization" and "Fostering collaboration among CPS professionals in academia, government, and industry".

Below the banner, the page title is "CPS: Synergy: Collaborative Research: Control of Vehicular Traffic Flow via Low Density Autonomous Vehicles". It is submitted by "sprinkle" on Mon, 12/21/2015 - 5:30pm. The page includes a "Project Details" section with the following information:

Lead PI:	Jonathan Sprinkle
Performance Period:	01/01/15 - 12/31/17
Institution(s):	University of Arizona
Sponsor(s):	National Science Foundation
Award Number:	1446435

894 Reads. Placed 290 out of 803 NSF CPS Projects based on total reads on all related artifacts.

Abstract: In the next few decades, autonomous vehicles will become an integral part of the traffic flow on highways. However, they will constitute only a small fraction of all vehicles on the road. This research develops technologies to employ autonomous vehicles already in the stream to improve traffic flow of human-controlled vehicles. The goal is to mitigate undesirable jamming, traffic waves, and to ultimately reduce the fuel consumption. Contemporary control of traffic flow, such as ramp metering and variable speed limits, is largely limited to local and highly aggregate approaches. This research represents a step towards global control of traffic using a few autonomous vehicles, and it provides the mathematical, computational, and engineering structure to address and employ these new connections. Even if autonomous vehicles can provide only a small percentage reduction in fuel consumption, this will have a tremendous economic and environmental impact due to the heavy dependence of the transportation system on non-renewable fuels. The project is highly collaborative and interdisciplinary, involving personnel from different disciplines in engineering and mathematics. It includes the training of PhD students and a postdoctoral researcher, and outreach activities to disseminate traffic research to the broader public. This project develops new models, computational methods, software tools, and engineering solutions to employ autonomous vehicles to detect and mitigate traffic events that adversely affect fuel consumption and congestion. The approach is to combine the data measured by autonomous vehicles in the traffic flow, as well as other traffic data, with appropriate macroscopic traffic models to detect and predict congestion trends and events. Based on this information, the loop is closed by carefully following prescribed velocity controllers that are demonstrated to reduce congestion. These controllers require detection and response times that are beyond the limit of a human's ability. The choice of the best control strategy is determined via optimization approaches applied to the multiscale traffic model and suitable fuel consumption estimation. The communication between the autonomous vehicles, combined with the computational and control tasks on each individual vehicle, require a cyber-physical approach to the problem. This research considers new types of traffic models (micro-macro models, network

Related Artifacts

Presentations

CPS: Synergy: Collaborative Research: Control of vehicular traffic flow via low density autonomous vehicles | [Download](#)

Posters

Phantom Traffic Jams from Adaptive Cruise Controlled Vehicles | [Download](#)

CPS: Synergy: Collaborative Research: Control of Vehicular Traffic Flow via Low Density Autonomous Vehicle | [Download](#)

Datasets

Recreate the Dissipation of Stop-and-Go Waves Graphs Using MATLAB | [Download](#)

CPS-VO

Recreate the Dissipation of Stop-and-Go Waves Graphs Using MATLAB

Properties

Submitted by [clairemcgonigle](#) on Tue, 04/19/2022 - 7:15pm. Contributor: [Jonathan Sprinkle](#)

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[Recreate the Dissipation of Stop-and-Go Waves Graphs Using MATLAB](#)



[ZIP archive](#) | [189.95 MB](#) | [33 reads](#) | [2 downloads](#) | [Download](#) | [Request DOI](#) | [PDF version](#) | [Printer-friendly version](#)



1446435 Dataset



vehicle_trajectory_data...



code



data



expected output



Instructions to
Recreat...LAB.pdf



ReadMe.txt

https://www.canva.com/design/DAE9E_AzqKo/f68TOatch?utm_content=DAE9E_Azare_your_design&utm_mediuareyourdesignpanel

Let's get started

A dark blue background on the left side of the slide, separated from a white background on the right by a thin white diagonal line that slopes upwards from left to right.

To start, you should have prepared:

- A username on the VO
- The project license
- A list of project contributors
- The Award ID(s) you will be using
- A README with specific instructions on recreating the data, including
 - Software used
 - Dependencies
 - Step-by-step instructions to reproduce the data results
 - Any necessary links (software downloads, etc.)
 - Expected output images
 - A link to the data and code if it is available for download elsewhere
- A zip file containing the data, code, and README (if uploading data directly)

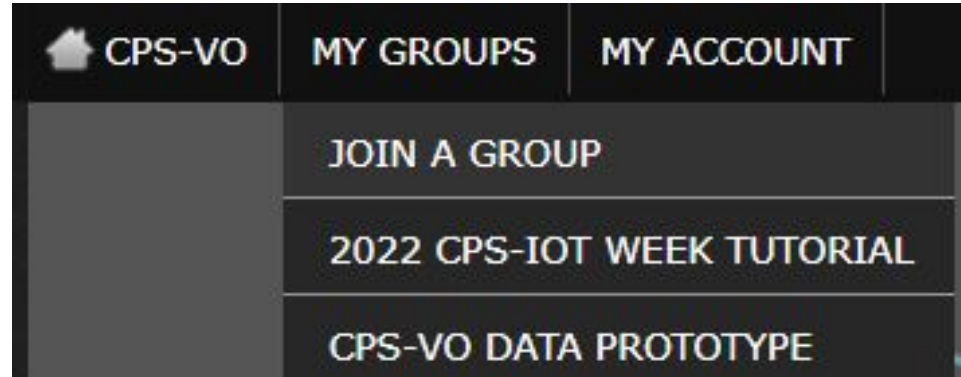
Uploading a Prototype for Primary Verification

We will first be walking through how to upload data privately, to work out any issues.


Then, we will explain how to publish this data.

Navigate to the 2022 CPS-IoT Week Tutorial Group

From the homepage of the CPS-VO,
hover over “My Groups” and select
“2022 CPS-IoT Week Tutorial”



Under the
“Collaborate” tab
on the left side of
the screen, click
“Upload Files”

Home 

Agenda

Get Started

Organizers

Files

COLLABORATE 

- ~~Create Bibliographic Reference~~
- **Upload File**
- ~~Create News Item~~
- Create Project
- Post Video
- Create Webform
- Create Web Page
- Create Wiki Page

Click the “Choose File” button

- If uploading data directly, choose the zip file
- If data is elsewhere, choose the README.

The name of the file will be displayed

CPS-VO > CREATE CONTENT > FILE >

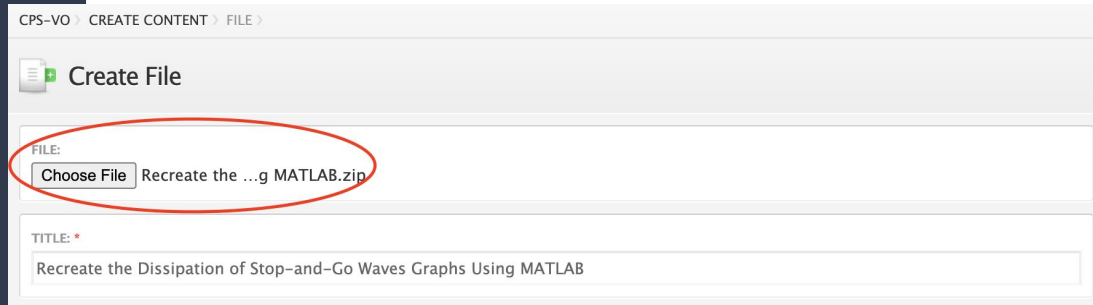
Create File

FILE:

Recreate the ...g MATLAB.zip


TITLE: *

Recreate the Dissipation of Stop-and-Go Waves Graphs Using MATLAB



Under the “title”
field, enter an
appropriate title for
the project

CPS-VO > CREATE CONTENT > FILE >

 Create File

FILE:

Recreate the ...g MATLAB.zip

TITLE: *

Recreate the Dissipation of Stop-and-Go Waves Graphs Using MATLAB

Under the
“Description” field,
copy and paste the
full, detailed
instructions for
recreating the
experiment data.

Please note that copying
and pasting from Microsoft
Word is the best way to
ensure that all formatting,
links and images are
properly transferred.

In the “Associated Award ID” box, enter the corresponding Award ID.

If there are multiple, enter all of these separated by commas.

Vocabularies

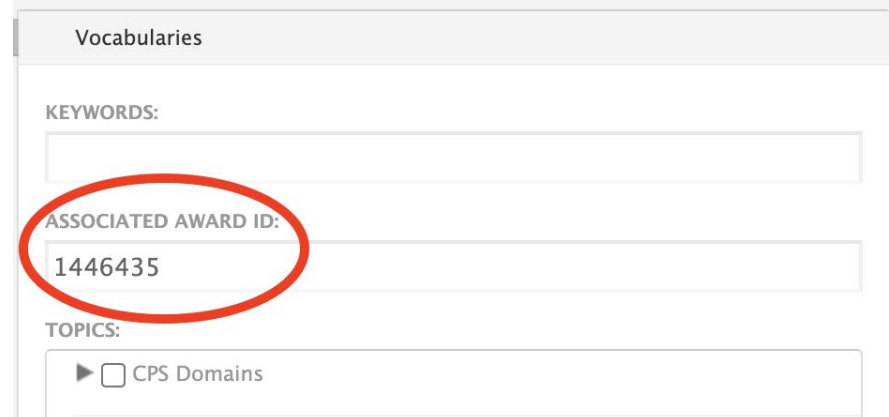
KEYWORDS:

ASSOCIATED AWARD ID:

1446435

TOPICS:

CPS Domains

A screenshot of a web form titled "Vocabularies". The form contains several input fields. The "KEYWORDS:" field is empty. The "ASSOCIATED AWARD ID:" field contains the text "1446435" and is circled in red. The "TOPICS:" field contains a checkbox labeled "CPS Domains" which is currently unchecked.

Under “Document Type” select “Dataset”

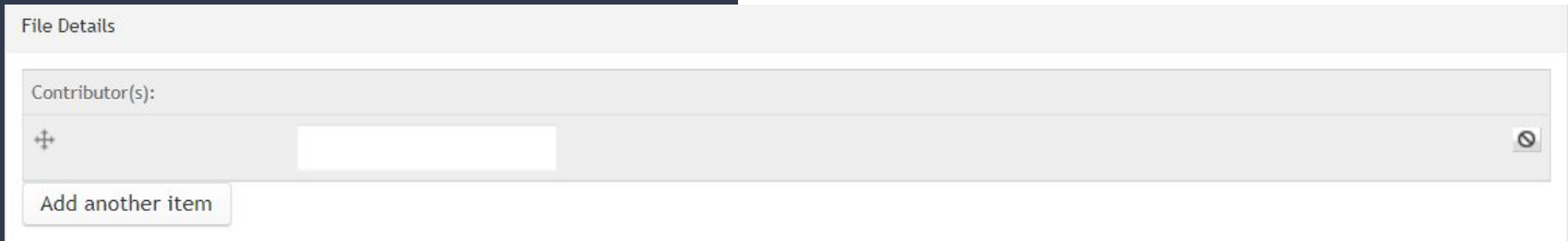
DOCUMENT TYPE:

- Agenda
- Abstract
- Annotated Reference
- Announcement
- Call for Proposal
- Congressional Testimony
- Courseware
- Dataset**
- Documentation
- Draft
- Executive Summary
- Meeting Minutes
- Memo
- Model
- Poster

Under “File
Details,” add
“Contributor(s)”

File Details

Contributor(s):

A screenshot of a software interface titled "File Details". It features a light gray header bar with the title. Below the header is a form area with a label "Contributor(s):" followed by a wide, empty text input field. To the left of the input field is a small plus sign icon, and to the right is a small square icon with a diagonal slash. Below the input field is a button labeled "Add another item".

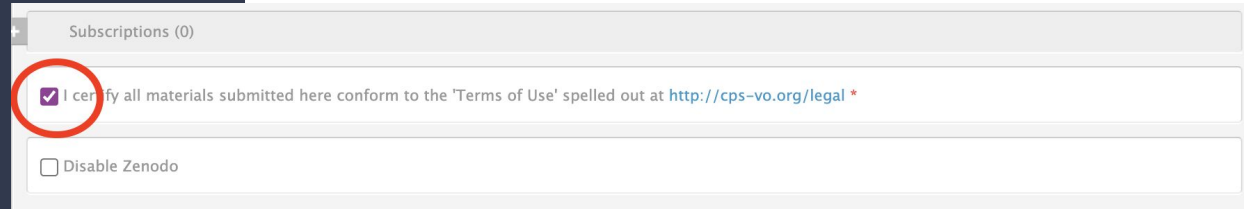
Under “License,”
select the
appropriate license

LICENSE: *

Creative Commons 2.5



Check the box next to the statement “I certify all materials submitted here conform to the 'Terms of Use' spelled out at <http://cps-vo.org/legal> *”



A screenshot of a web form titled "Subscriptions (0)". The form contains two input fields. The first field has a checked checkbox (indicated by a red circle) and the text "I certify all materials submitted here conform to the 'Terms of Use' spelled out at <http://cps-vo.org/legal> *". The second field has an unchecked checkbox and the text "Disable Zenodo".

Subscriptions (0)

I certify all materials submitted here conform to the 'Terms of Use' spelled out at <http://cps-vo.org/legal> *

Disable Zenodo

Confirm that when “Groups” is selected on the bottom left, under Audience, “2022 CPS–IoT Week Tutorial” is selected, and “Public” is unchecked.

We will change this setting later when we fully publish the data, but for now this will ensure it stays private to the group

The screenshot shows a settings interface with a sidebar on the left and a main content area on the right. The sidebar contains the following sections:

- Notifications
- Groups**
- Publishing options
Published, Conflict detection enabled
- URL path settings
No alias
- Authoring information
By noellesweeney
- Printer, email and PDF versions
- Search engine settings

The main content area displays the 'AUDIENCE:' settings:

- 2022 CPS-IoT Week Tutorial
- CPS-VO Data Prototype
- Public

To ensure the data is private to only you, uncheck “published” under “Publishing Options”

Notifications	<input type="checkbox"/> Published
Groups	<input type="checkbox"/> Pin to Top of Lists
Publishing options Not published, Conflict detection enabled	<input checked="" type="checkbox"/> Conflict detection enabled
URL path settings No alias	
Authoring information By noellesweeney on 2022-04-21 17:57:28 -0400	
Printer, email and PDF versions	

Under
“Notifications,”
choose whether to log
a message detailing
the changes that have
been made, or click
“Do not send
notifications for this
update.”

Notifications	
Groups	
Publishing options Published	
URL path settings No alias	
Authoring information By noellesweeney on 2022-04-06 00:14:57 -0400	
Printer, email and PDF versions	
Search engine settings	


LOG MESSAGE:

Do not send notifications for this update.

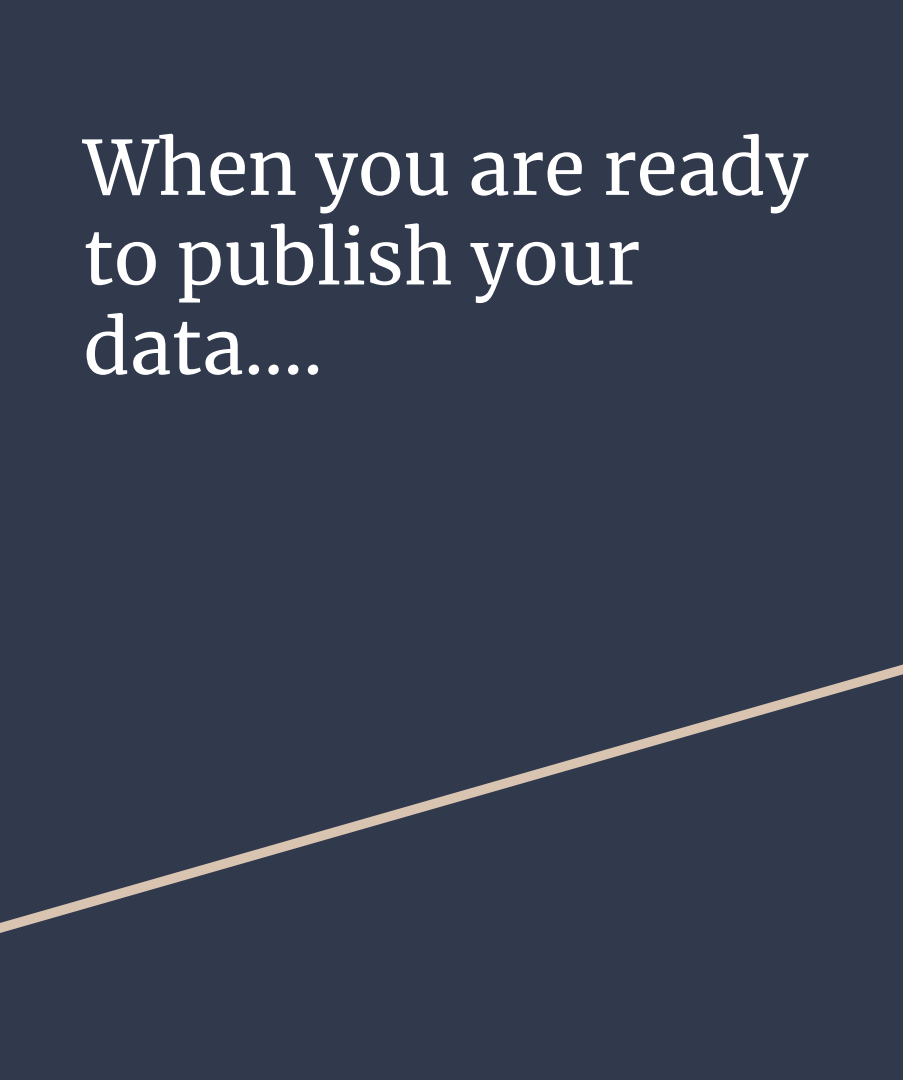
Click “Save” either
at the top right or
bottom left



From your project page, the Dataset should be visible as an Artifact.



When you are ready
to publish your
data....



Modifying a Previously Private Dataset

Once the dataset has been uploaded and verified, the next step is to make it publicly available on the CPS-V0.

Navigate to the
previously
uploaded file

CPS-VO » CPS-VO DATA PROTOTYPE

🔒 CPS-VO Data Prototype

- Home →
- About
- Members
- Research
- Modboard
- Forums
- Files**

COLLABORATE ▾

- Create Bibliographic Reference
- Create Event
- Upload File
- Create Forum Topic
- Create News Item
- Create Project
- Post Video
- Create Webform
- Create Web Page
- Create Wiki Page

If the dataset was uploaded to the CPS-IoT Week Tutorial Group, navigate to the upload by clicking “Files” on the CPS-IoT Week Tutorial Group page

Click “Edit”

Modify any fields
that you wish to
change before
publishing

If you wish to completely delete the data, click “Delete” on the top right.

Save

Preview

View changes

Delete

If you are uploading a new data file, click “Choose File” on the top left. The old file will be overwritten.

CPS-VO > CREATE CONTENT > FILE >

Create File

FILE:

Choose File

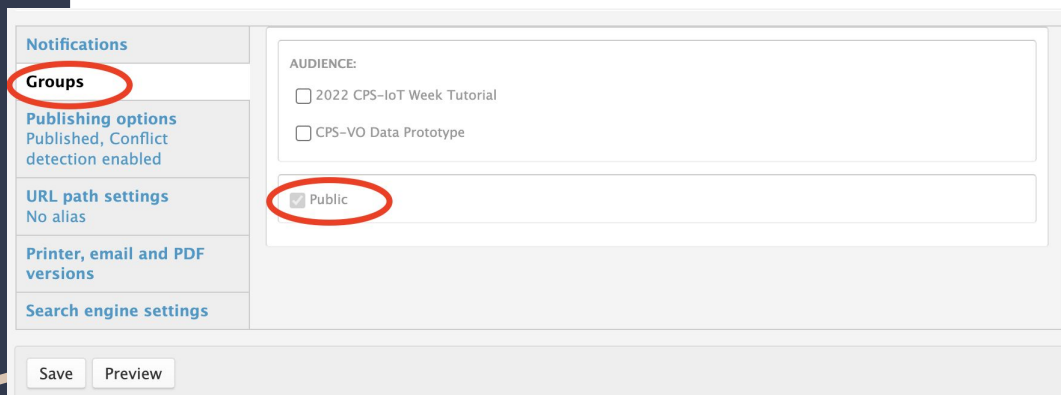
Recreate the ...g MATLAB.zip

TITLE: *

Recreate the Dissipation of Stop-and-Go Waves Graphs Using MATLAB

Change the privacy of the dataset by navigating to “Groups”

Check the “public” box to release the dataset publicly



The screenshot shows a configuration interface with a left sidebar and a main content area. The sidebar contains several menu items: 'Notifications', 'Groups', 'Publishing options', 'URL path settings', 'Printer, email and PDF versions', and 'Search engine settings'. The 'Groups' item is highlighted with a red circle. The main content area is titled 'AUDIENCE:' and contains two unchecked checkboxes: '2022 CPS-IoT Week Tutorial' and 'CPS-VO Data Prototype'. Below these is a section with a checked checkbox labeled 'Public', which is also circled in red. At the bottom of the interface are 'Save' and 'Preview' buttons.

Check any appropriate groups to share the dataset with

Publish the data by ensuring that the “Publish” box under “Publishing Options” is checked

Notifications	<input checked="" type="checkbox"/> Published
Groups	
Publishing options Published, Conflict detection enabled	<input type="checkbox"/> Pin to Top of Lists
URL path settings No alias	<input checked="" type="checkbox"/> Conflict detection enabled
Authoring information By noellesweeney on 2022-04-21 17:57:28 -0400	
Printer, email and PDF versions	

Certify compliance with the terms of use

Re-check the box next to the statement
“I certify all materials here conform to
the ‘Terms of Use’ spelled out at
<http://cps-vo.org/legal>”

Subscriptions (0)

I certify all materials submitted here conform to the 'Terms of Use' spelled out at <http://cps-vo.org/legal> *

Disable Zenodo

Choose notification preferences


Under “Notifications,” choose whether to log a message detailing the changes you have made, or you may click “Do not send notifications for this update.”

Notifications
Groups
Publishing options Published
URL path settings No alias
Authoring information By noellesweeney on 2022-04-06 00:14:57 -0400
Printer, email and PDF versions
Search engine settings


LOG MESSAGE:

Do not send notifications for this update.

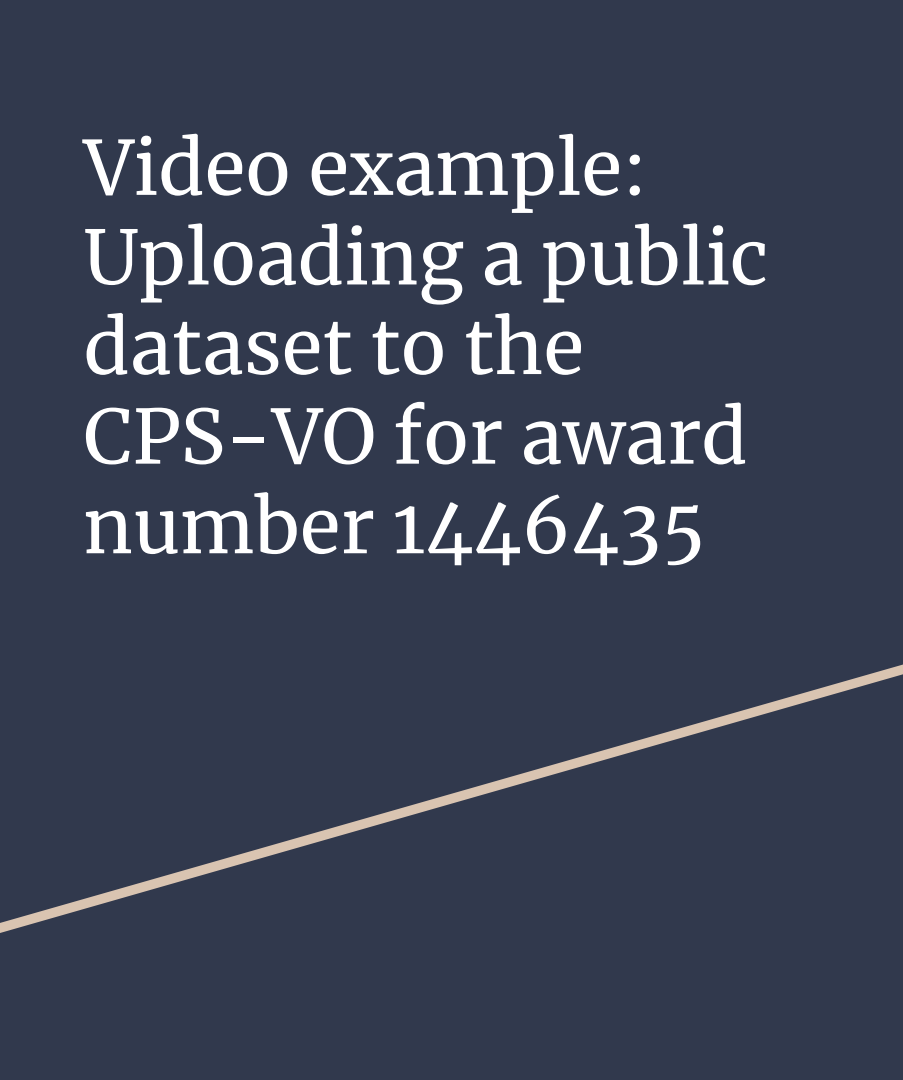
Click “Save” at either the top right or bottom left of the page, and your changes will be confirmed

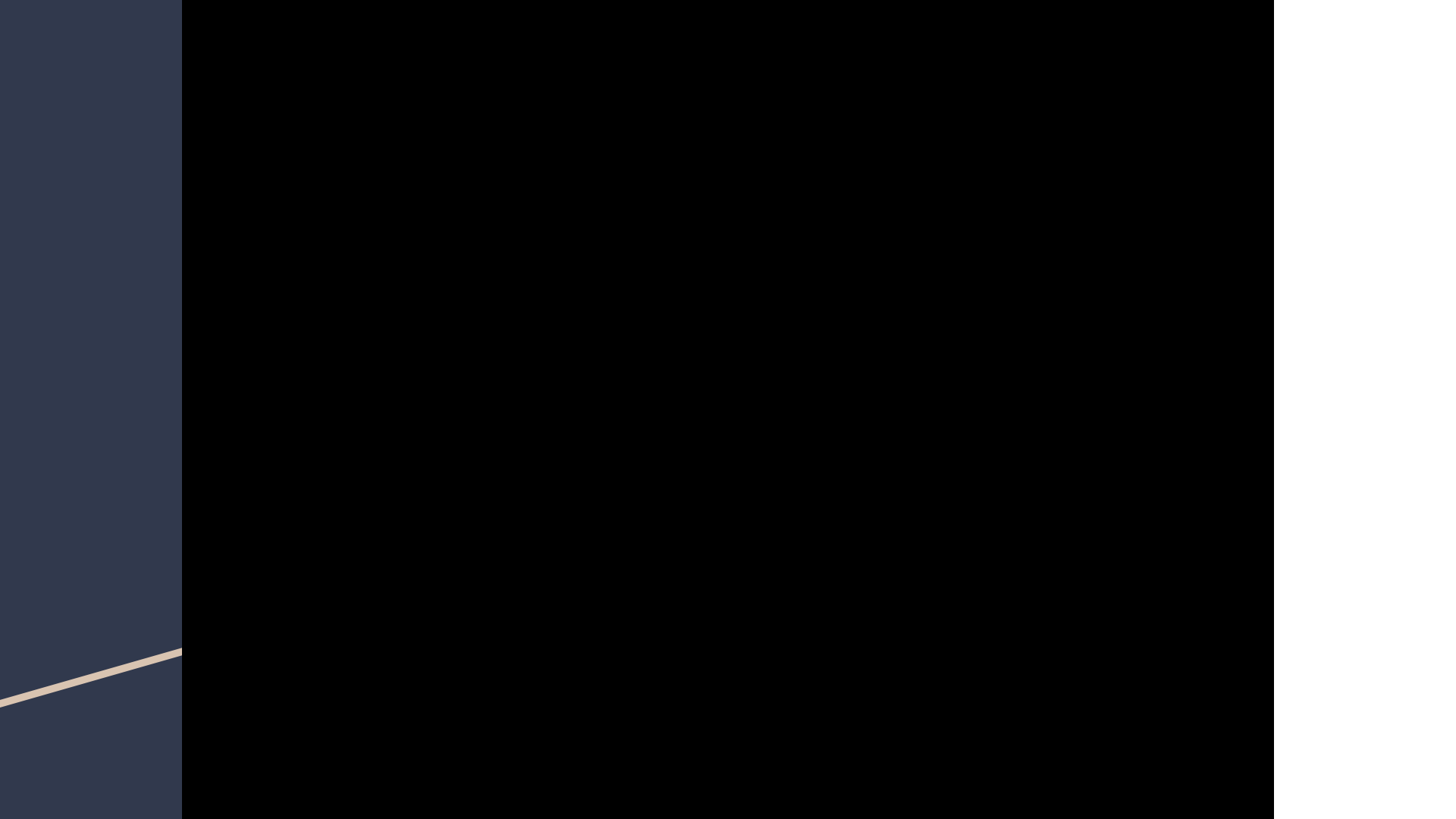


Navigate to your
project within the
CPS-VO to verify
that your data is
publicly viewable



Video example:
Uploading a public
dataset to the
CPS-VO for award
number 1446435





Example continued: What should be seen after upload

To view an example of what this dataset looks like after being publicly uploaded and associated with award number 1446435, navigate to:

<https://cps-vo.org/node/23965>

Submitted by [sprinkle](#) on Mon, 12/21/2015 - 5:30pm

Project Details

Lead PI:	Jonathan Sprinkle
Performance Period:	01/01/15 - 12/31/17
Institution(s):	University of Arizona
Sponsor(s):	National Science Foundation
Award Number:	1446435

881 Reads. Placed 290 out of 803 NSF CPS Projects based on total reads on all related artifacts.

Abstract: In the next few decades, autonomous vehicles will become an integral part of the traffic flow on highways. However, they will constitute only a small fraction of all vehicles on the road. This research develops technologies to employ autonomous vehicles already in the stream to improve traffic flow of human-controlled vehicles. The goal is to mitigate undesirable jamming, traffic waves, and to ultimately reduce the fuel consumption. Contemporary control of traffic flow, such as ramp metering and variable speed limits, is largely limited to local and highly aggregate approaches. This research represents a step towards global control of traffic using a few autonomous vehicles, and it provides the mathematical, computational, and engineering structure to address and employ these new connections. Even if autonomous vehicles can provide only a small percentage reduction in fuel consumption, this will have a tremendous economic and environmental impact due to the heavy dependence of the transportation system on non-renewable fuels. The project is highly collaborative and interdisciplinary, involving personnel from different disciplines in engineering and mathematics. It includes the training of PhD students and a postdoctoral researcher, and outreach activities to disseminate traffic research to the broader public. This project develops new models, computational methods, software tools, and engineering solutions to employ autonomous vehicles to detect and mitigate traffic events that adversely affect fuel consumption and congestion. The approach is to combine the data measured by autonomous vehicles in the traffic flow, as well as other traffic data, with appropriate macroscopic traffic models to detect and predict congestion trends and events. Based on this information, the loop is closed by carefully following prescribed velocity controllers that are demonstrated to reduce congestion. These controllers require detection and response times that are beyond the limit of a human's ability. The choice of the best control strategy is determined via optimization approaches applied to the multiscale traffic model and suitable fuel consumption estimation. The communication between the autonomous vehicles, combined with the computational and control tasks on each individual vehicle, require a cyber-physical approach to the problem. This research considers new types of traffic models (micro-macro models, network approaches for higher-order models), new control algorithms for traffic flow regulation, and new sensing and control paradigms that are enabled by a small number of controllable systems available in a flow.

Related Artifacts

Presentations

[CPS: Synergy: Collaborative Research: Control of vehicular traffic flow via low density autonomous vehicles](#) | [Download](#)

Posters

[Phantom Traffic Jams from Adaptive Cruise Controlled Vehicles](#) | [Download](#)

[CPS: Synergy: Collaborative Research: Control of Vehicular Traffic Flow via Low Density Autonomous Vehicle](#) | [Download](#)

Datasets

[Recreate the Dissipation of Stop-and-Go Waves Graphs Using MATLAB](#) | [Download](#)

This zip file contains the necessary code and data files, instructions for data recreation, and a video demonstration of how to recreate the data

Example: changing the dataset we just published

- When the data is public, everyone can see it—even those not logged into the VO
- When it is changed to private, the account that created it can still see it, but others cannot
- The members of the checked group can also see the data

CPS-VO funding statement

This project is supported by the National Science Foundation under Award 2151500 (PI: Jonathan Sprinkle). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.