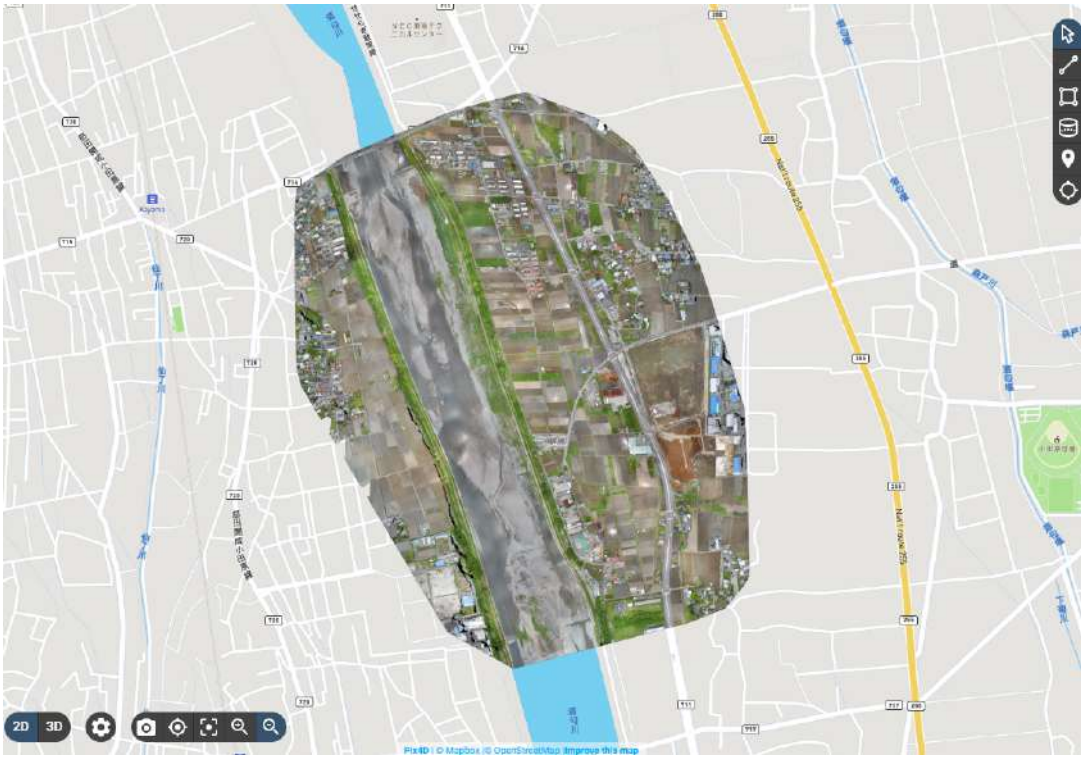
Disaster preparedness with local governments



Orthomosaic made of images taken during a disaster drill - layer displayed over a basemap

Japan Flying Labs leader operates eBeeX during the disaster drill in Odawara city

Japan Flying Labs members analyze orthomosaic images with local officials during the disaster drill in Odawara city

OVERVIEW	
Flying Labs	Japan Flying Labs
Geographic area	Western and Eastern Japan
Date range	Ongoing since September 2016
Sector program	AidRobotics
Main SDGs	GOAL 9: Industry, Innovation and Infrastructure GOAL 11: Sustainable Cities and Communities GOAL 13: Climate Action GOAL 17: Partnerships to achieve the Goal

SCOPE	
Project stakeholders	As of January 2021, 30+ cities in Western and Eastern Japan
Who benefits	Local residents, firefighters, rescue teams and local governments
Number of people impacted	Over 8.5 million people
Challenge	Natural disasters are very common in Japan and drones can play an important part in contributing to disaster preparedness and response efforts. However, drone operators face the challenge of changing regulations year to year, which may prevent them from providing a timely and efficient response.
Scope	Partnership between Japan Flying Labs and local governments for the use of drones in annual drills and response efforts. This involves: ● Establishing agreements with the government for the purpose of disaster response in order to obtain pre-approvals and deploy at short notice, in line with regulation requirements. ● Conducting community engagement sessions with local populations and raising awareness about the use of drones for disaster response. ● Flying drones in annual disaster response simulation drills to capture imagery and create libraries which can be used for post-catastrophe aerial imagery comparison. ● Deploying drones for crisis mapping within the first two hours of a disaster and liaising with government entities to communicate findings. ● Supporting local governments to turn data into action and use drone data to perform damage assessment, target deployment of resources and more. Japan Flying Labs have established agreements and work practices with the local governments, so that when disasters strike, the team can deploy at short notice. The goal of Japan Flying Labs is to begin crisis mapping and response within just the first two hours from the onset of a disaster in order to deliver key information to the local governments so they can adapt their response.
Outcome	The partnerships and drills with local governments resulted in the following disaster response efforts:

	● 2019 Typhoon Faxai: Kimitsu city, Chiba Prefecture. ● 2019 Typhoon Hagibis: Sagamihara city, Kanagawa Prefecture, Machida city (Tokyo), Chofu city (Tokyo), Komae city (Tokyo). Some local governments used the orthomosaics as a reference to issue 'disaster affected' certificates to people. Some mayors used the orthorectified images to explain the damage situation at press conferences.
Impact	Through this ongoing partnership and program, local governments have acknowledged the value of drones and the power of drone data for disaster preparedness and response. In particular, they became familiar with drone outputs such as orthomosaic images and their high level of resolution which helps assess damage where teams on the ground have no access. Orthomosaic images have also helped the citizens affected by the Faxai Typhoon obtain certificates to apply for financial aid to cover the damages.
Next steps	Our drill and disaster response efforts over the years have helped us build credibility amongst local government, government entities and other stakeholders involved in disaster response. This will lead to new partnerships. We will keep engaging with new government entities to participate in their preparedness efforts and establish agreements allowing us to gain pre-approvals and deploy disaster drones at short notice. In addition, we will keep consolidating aerial imagery in the districts where we already perform drills.

COMMUNITY ENGAGEMENT AND STAKEHOLDER SUPPORT	
Consent for data acquisition	Consent by the local governments is obtained through our existing agreements in place. We also communicate with the relevant police authorities ahead of deployment and engage with local communities during our drills and responses.
Activities to engage with the community	Community engagement and raising awareness during annual disaster drills.
Community groups engaged with	Local government officials, community members.

Community attendance	Hundreds to thousands of people attend each disaster drill.
Community feedback	We have received positive feedback from the communities affected including proactive requests to openly share orthomosaic images to strengthen disaster preparedness efforts. Our work has led to more requests coming directly from the communities, such as checking flood levels inside the levees and obtaining data to discuss their use of watersides. We have had very good relationships with local communities along the Tama river in Tokyo who have been discussing the way in which local citizens should use the waterside.
Stakeholder support	Provided KML files and URL links.

DATA ACQUISITION	
Size of area	Depending on a disaster-damaged area
Drone	Depending on disasters and drills (eBee X, Phantom 4 Pro etc)
Sensor(s)	RGB
Flight plan software	PIX4Dcapture, DJI GS Pro, DroneDeploy, eMotion
Flight height	Depending on location. (About 150 meters or above 150 meters above the ground.)
GSD (Accuracy)	Depending on location about 3-5 cm per pixel
Number of images acquired	Depending on missions
Number of flights	Depending on a disaster/drill location
Time invested in data acquisition	Depending on missions
Georeferencing	Usually onboard GPS

DATA PROCESSING & ANALYSIS	
Processing software	PIX4Dreact, PIX4Dmapper, PIX4Dcloud, MetaShape, OpenDroneMap
Processing time	Depending on the number of images and software
Data products	Orthomosaic and point cloud
Analysis tools	-
Analysis outputs	-
Final outputs shared with stakeholders	The license of outputs is CrisisMappers Japan/DRONEBIRD CC BY 4.0 KML files shared with relevant local governments

	GeoTiff files are layered on Hinata GIS All URL links and raw data for each mission are listed as a repository on Github (Search in all Github: dronebird/oam) For mapping, xyz tiles images are used as layers of HOT/OSM.
Data sharing	Licence is CC BY 4.0 ©name of operator /DRONEBIRD, CC BY 4.0 GitHub Aerial images are uploaded to OpenAerialMap or PIX4DCloud Examples in GitHub https://github.com/dronebird/oam_tokyo20191020chofukomae01 https://github.com/dronebird/oam_tokyo20170902chofu01