

Skypull prototype during testing (October 2020).





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Save Japan from a Future Social Crisis! “Mothership” Project Current Development Progress

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“Mothership” Project has been started since 2018 with very futuristic and noble vision for solving social issues such as energy security and/or government financial difficulties due to less emerging industry for many developed countries using high altitude westerly jet streams strong wind [1].

Inflatable structure kite configuration is adopted with potentials to realize both large wind area and less weight. The structure can be deformed with wind and tether force, so its dynamics and control are important technology issues for our project.

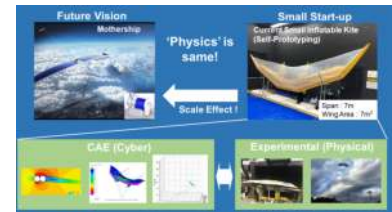
We started to design and fabricate small inflatable kites from fabric in order to learn many significant technologies like fabric choices, joining methods, CAE, and dynamics control methods etc. from many predecessors in this AWE participants.

Our kite usages are not only for power generation but aerial platform for observation, communication and aerial mobility etc. Therefore, the first milestone was set to reach 1000m AGL with stable flight.

By virtue of engineering struggling developments for two years we achieved the milestone on May 27 in 2020 [2]. We have learned inflatable kite design, fabrication and evaluation technologies through the process.

The next milestone is a 24-hours long-term continuous flight at mountain region with very turbulent high speed wind. We had to introduce more rigid kite configuration design and appropriate attitude control system to be sta-

ble flight. Our development progress is getting faster and faster.



Pattern diagram of Mothership Project 'Small Start-up'



First milestone achievement

References:

- [1] Itakura, E.: Save from Future Japan Social Crises! ‘Mothership’ Project, Airborne Wind Energy Conf. p.71 2019
- [2] Toyota Official Website https://www.toyota-global.com/innovation/partner_robot/news/202201_01.html