<https://www.nasa.gov/pdf/716074main_Short_2011_PhI_Printable_Spacecraft.pdf>

<https://www.nasa.gov/sites/default/files/files/Short_2012_PhII_PrintableSpacecraft.pdf>

Maybe we can look into in-situ 3d printing and electronics? Modular space exploration? Materials identification and usage?

**Article Authors:** Kendra Short, Dr. David Van Buren

**Article Title:** Printable Spacecraft: Flexible Electronic Platforms For NASA Missions

**Purpose of the study:** Study of printed electronics technology

**Research Questions:** Are printable spacecraft practical in space exploration usage?

**Current Knowledge on Topic/Introduction:** Printed electronics can be used to greatly enhance the potential of any mission in outer space. These electronics are soluble and ‘printed’ onto a substrate in order to form the system. This method is inherently modular and can be applied to areas such as intelligent structures, conformal sensing, and, ultimately, build an entire spacecraft out of printed electronics.

**Results/Future Work:** The research team believes printed electronics in space is a technology worth pursuing. Benefits of light weight, low volume, and low cost make it valuable. A ‘spacecraft’ is *feasible* if it is redefined to being a “multifunctional system made from printed flexible electronics.” The technology is suitable for every program as it provides on demand devices.

**Relation to Project:** answers the question, why would we need to make such a thing?

**Sources (Is there more info in *its* sources?):**

**Additional Notes:**

The study tasks were “(1) define a reference mission which

exploits a printed spacecraft, (2) build a functional prototype of a printed spacecraft, (3) conduct

environmental testing on materials and devices (4) perform a cost/benefit analysis within the

context of the reference mission (5) prepare roadmaps for the reference mission and other

Applications.”

Essentially, the advice the team shares is authentic and well-researched since the potential benefits of printed electronics in space were fully evaluated as a potential NASA mission.

* Low-cost, minimum resource to augment science return
* Rovers may print instruments to enable more experiments
* Enable in-situ reconfigurability
* Design of a flexible printed electronics science station
  + Successful prototype
* Printed electronics arise from a soluble form - “functional inks”
  + Printed onto substrates to form sheets of electronic circuits