Prospects for Leveraging on 3D-Printing & Local Materials for STEM and Space Education Development in Africa: A Case of IrawoScope -Africa's first 3D-Printed Affordable Telescope.

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Introduction

Centuries before Galileo Galilea invented the Telescope, the beauty and fascination of the Stars has always served as inspiration for innovation for humankind. Traditionally, Africans have always relied a lot on astronomy in daily life. Often relying on local knowledge about the Planets and the position of the Sun to determine Seasonal changes. However, the rate of technology growth in recent years has been tremendously exponential. These emerging technologies such as 3D-Printing, Artificial Intelligence, Virtual and Augmented Reality are beginning to disrupt our daily lives. In particular, 3D-Printing offers an exciting opportunity to improve the quality of STEM Education while enhancing hands-on experiential learning to visualize and make into reality somewhat theoretical principles.

This paper presents the prospect and challenges of leveraging on 3D-Printing Technology and Local Materials for improving Space Education in Africa. Specifically, it introduces; IrawoScope – Africa's first 3D-Printed Affordable Amateur Telescopes. IrawoScope was designed and manufactured by Nigerian Educational Startup- AstioTech Enterprise. Finally, some challenges inherent in these technologies were also outlined in this presentation.

Who we are

AstioTech Enterprise is a tech-based Social-Impact Driven Education Startup that was founded in early 2017, with the goal of inspiring the curiosity of the next generation of scientist, innovators and problem solvers using the beauty and fascination of Astronomy and the Stars. At AstioTech, we are working to manufacture affordable Amateur Telescopes by leveraging on exponential 3D-Printing technology. In addition, to help ensure affordability, we improvise certain parts of the Telescope (like the tube), with locally available materials like PVC pipes and also working to introduce Bamboo as well. Although, having successfully produced the prototype (IrawoScope), the project is still in the beta testing phase and shows a lot of prospect. The figure above (Fig 1) shows an overview of the basic components of IrawoScopeTelescope.

Product Design and Development

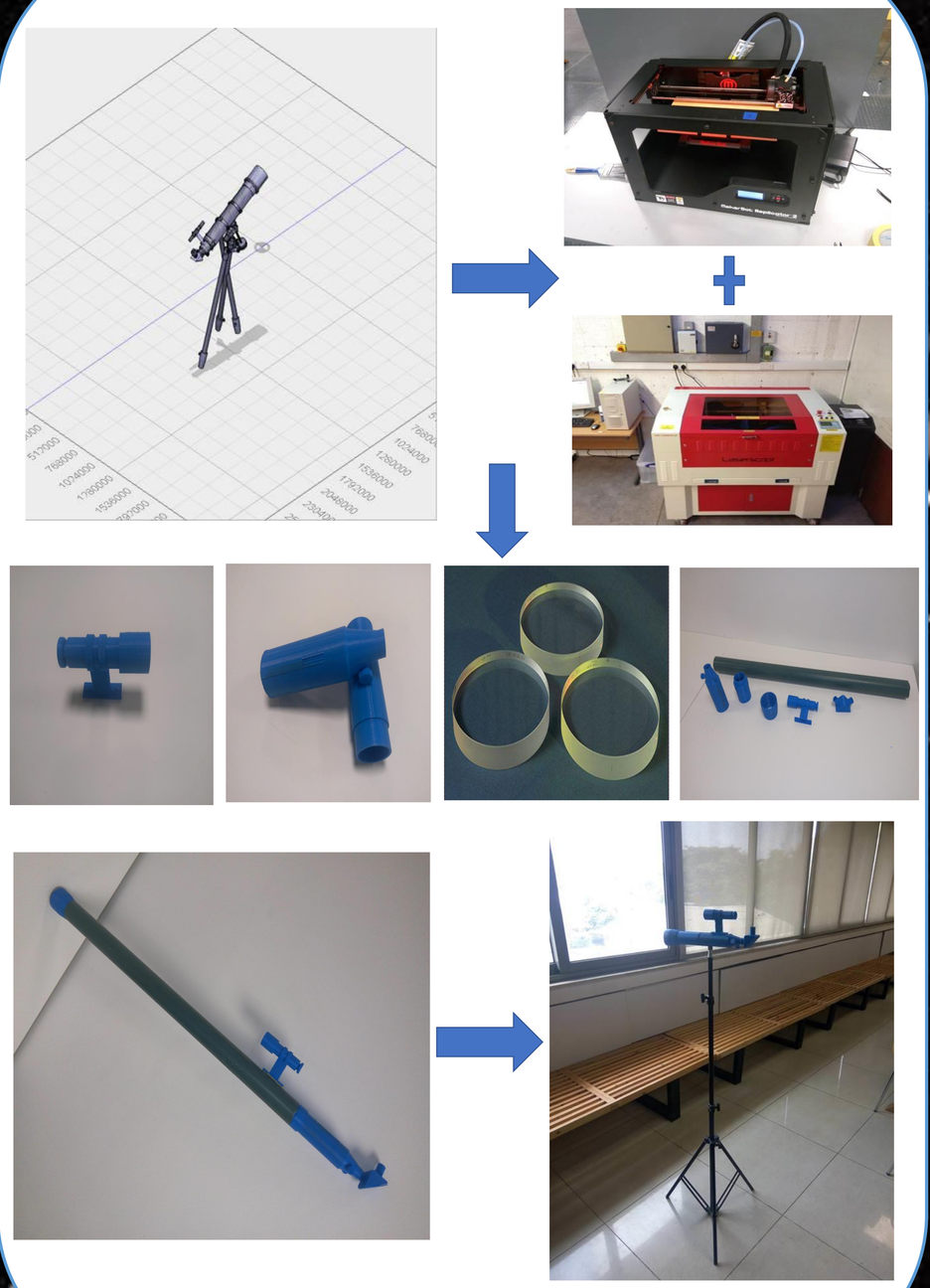

Figure 1: An Overview of the Basic Components of IrawoScope Telescope

Education Outreach Efforts

AstioTech is likewise involved in STEM Education outreach activities aimed at inspiring young African students in underserved local community secondary schools with the beauty of the stars. In addition to manufacturing 3D-Printed Telescope, AstioTech is currently carrying out the Pilot phase of Product testing and validation.

Figure 2: An Educational Outreach Session carryout by AstioTech

Challenges Encountered

The challenges encountered so far with the project are outline below;

- Inadequate Power and Electricity to run the 3D-Printers
- Astronomy is a relatively unpopular discipline among Africans.
- Unavailability of funds needed to scale up.

Recommendations

From the past few months of working on this project, the following recommendations are offered;

- African Governments should work on improving and making Power Supply more available.
- Astronomy should be introduced as one of the subjects within secondary school curriculum.
- Public-Private partnerships should be encouraged in other to help provide the needed fund and support to starts working to improve Space Education in Africa.