

## Senior Design Project Description

<b>Company Name</b>	<i>Globalstratos, Inc.</i>	<b>Date Submitted</b>	<i>07/10/2020</i>
<b>Project Title</b>	<i>Infrastructure Design for Asseza™ Multiplex Container Laboratory (GLOBAL ASSEZA)</i>	<b>Planned Starting Semester</b>	Fall 2020

### Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills:

<b>Discipline</b>	<b>Number</b>	<b>Discipline</b>	<b>Number</b>
Mechanical	3	Electrical	1
Computer	1	Systems	
Other ( )			

### Company and Project Overview:

Globalstratos focuses on regenerative, and inclusive, economic development and growth.

The Mission of Globalstratos is to:

Create, grow, and sustain value streams (e.g., economic, social, community) with the collaboration and/or participation, and for the benefit, of stakeholders (e.g., communities, individuals, families, government, private sector, faith institutions, civil society). These streams merge together as a tapestry for a diverse, but synergized global economy (of prosperity) that is inclusive and boundary spanning\*.

\*[www.globalstratos.com](http://www.globalstratos.com)

Our core capabilities include economic and project development, as well as management company services for ventures and projects. One of our streams is projects that leverage natural resource value chains in industrial projects.

We are spinning off product/platform ideas that complement our core capabilities. This project focuses on development of a technology and product platform to assist in natural resources management in the form of a mobile/portable laboratory/buy center. The lab will be designed in a 20 ft container. It will be manufactured in North Carolina. This project is partially supported by the NC Manufacturing Extension Partnership grant to help create jobs in North Carolina



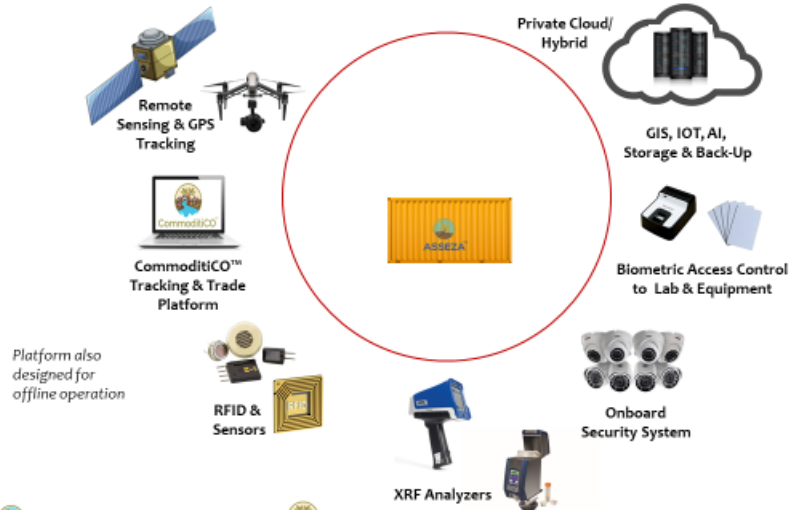
## Asseza™ Multiplex Mobile Lab



Benefits	Configurations	Some Available Applications/Platforms
<ul style="list-style-type: none"> <li>Designed for lay operators (non-scientific, non-technical)</li> <li>Provides real-time, quick analysis on site</li> <li>Provides analysis on a wide range of materials, e.g., water, soil, minerals, plants, in one mobile location</li> <li>Shifts many traditional lab tests to the field</li> <li>Combined with CommodityCO™ trade software, Multiplex™ becomes a mobile buy center for commodities</li> <li>Provides reliable, highly-accurate results using modern technology, e.g., X-Ray Fluorescence (XRF)</li> <li>Manage/oversee mobile operations centrally and securely</li> </ul>	<ul style="list-style-type: none"> <li>Field kit</li> <li>Van</li> <li>Container (mobile and semi-permanent)</li> <li>Permanent (if client chooses)</li> <li>Customized</li> </ul>	<p><b>Agriculture</b></p> <ul style="list-style-type: none"> <li>Soil, seed, fertilizer, and field characterization</li> <li>Food quality and control inspection</li> <li>Plant and crop analysis</li> </ul> <p><b>Geology and Mining</b></p> <ul style="list-style-type: none"> <li>Gemstone, metal, and other mineral analysis and assaying</li> <li>Fuel oil analysis</li> <li>Geochemistry</li> </ul> <p><b>Environmental</b></p> <ul style="list-style-type: none"> <li>Soil, air, and water analysis</li> <li>Hazardous material</li> <li>Environmental monitoring</li> </ul> <p><b>Geographic Information Systems</b></p> <ul style="list-style-type: none"> <li>Satellite and drone geospatial data for cross-sectoral analysis</li> <li>Sensors for continuous real-time data collection and analysis</li> </ul>

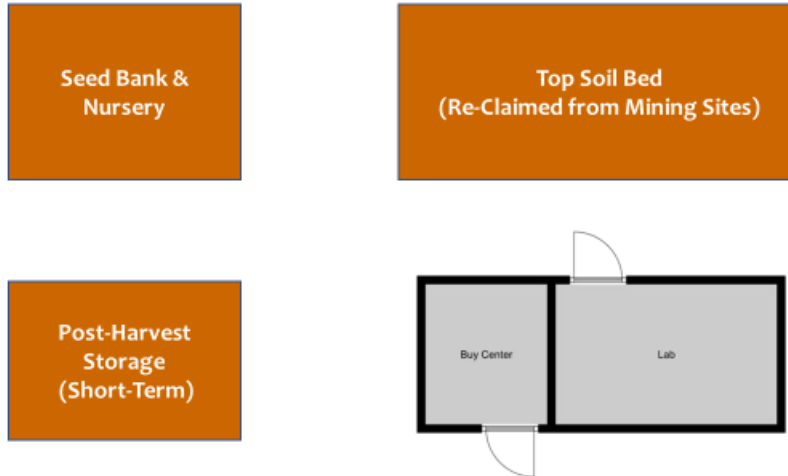
## Asseza™ Multiplex Connected Platform

(Remote services, management, and oversight)





## Multiplex™ Multi-Use Site



### **Project Requirements:**

Local communities and stakeholders often are unable to acquire information on their natural resources and environmental issues in an expeditious manner. Localized labs will allow them to manage their natural resources more effectively. There are other containerized laboratories available but they are costly. The focus for this project will be to develop a design at minimal cost so it will be affordable in developing countries. Requirements:

- Operate in environments from -10 Celsius to +45 Celsius
- Self-contained power, air, and water systems that provide a healthy working environment for lab teams and visitors
- Use materials that support antibacterial environments.
- Interior modular design that can be re-configured easily for multiple uses (could do sub-unit modules).
- Temperature controlled
- Ability to use local water sources (cleaning system)
- Provide a highly flexible lab environment while keeping costs down
- Majority of maintenance able to be conducted in-country where mobile lab is located (developing country)
- Since this is a comprehensive platform, a design of the complete container system including the buy and laboratory sections would be too much scope for a single senior design project.



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This project will therefore focus on the mechanical, power and electrical design infrastructure for the container that will support all future implementation schemes. The initial weeks of activity for the student team will be to understand the various plans for container services and then crystallize the electrical and mechanical design goals in the Project Performance Specifications and Statement of Work which will be agreed upon by the student team, mentor and Globalstratos.

**Expected Deliverables/Results:**

- Research standards and codes for this type of laboratory and develop guidelines for design based on those standards.
- Design for core laboratory design.
- Build prototype.

**Disposition of Deliverables at the End of the Project:**

- At the end of program, the product and all created work, including design documents, reports, prototype, electronic files, CAD, etc. should be turned over to us.
- Reference list of all articles, books, and other resources used in production of prototype. (Include electronic copies if possible.)

**List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):**

- If available students and faculty in environmental and geological engineering as support to team.