

## ***UHV Technologies, Inc.***

# **High Throughput IL-XRF Metal Scrap Sorter**

**August 24 – 25, 2016**

**Detroit, MI**

**METALS Annual Meeting**

**Team Members:**

**Phinix, LLC**

**OmniSource Corp.**



## UHV Technologies, Inc.

### nanoRANCH

Lexington, KY and Fort Worth, TX

Nalin Kumar, Manuel Garcia

## High Technology R&D Small Business

- Nanotechnology & Nano-biotechnology
- Advanced Materials & Devices
- Multi-Disciplinary Equipment Design
- Founded 22 years ago



## OmniSource

CORPORATION

Fort Wayne, IN

David Rosenblum, Stuart

Freimuth, Amit Dewan

## Largest Non-Ferrous Scrap Processor in US

- Wholly Owned Subsidiary of SDI
- 80+ Yards & 10+ Shredders
- Employs over 2500 people
- >7 million tons of ferrous scrap per year
- >1 billion lbs of nonferrous metals
- Founded 65 years ago



Lexington, KY

Subodh Das

## Light Metal Recycling R&D Small Business

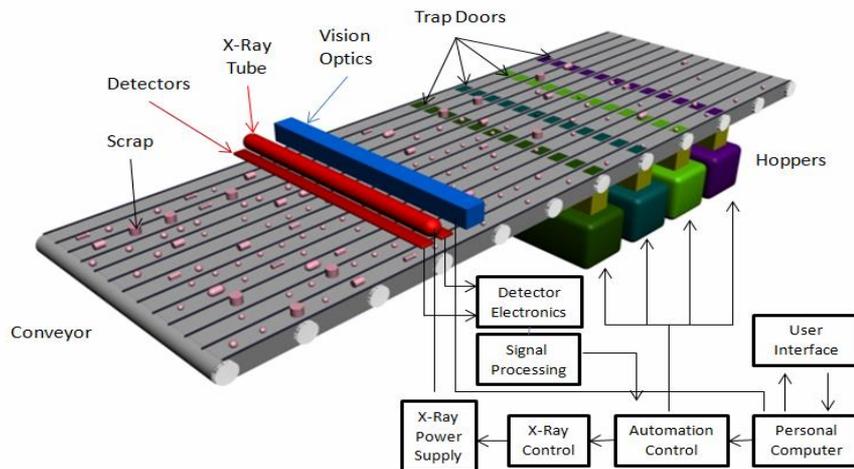
- Al, Mg and Ti Recycling R&D
- Advanced TEA Modeling
- Founded 8 years ago

**Overall Team Goal: Develop & Commercialize Sorters with 2, 4, 10 tons/hr Throughput**

# Technology Concept

**Novelty:** New XRF Technology Enables High Speed Sorting of Individual Al Alloys  
**Energy Security:** **2M tons/yr** of Al scrap available for domestic re-use  
**Energy Efficiency:** **20X** improvement in electricity utilization by recycling of Al  
**Reducing Emissions:** **25M tons** reduction in CO<sub>2</sub> emissions

## IL-XRF Concept



## ARPA-E Metrics

Metric	State of the Art	ARPA-E Target	UHV
Sorting Capacity	Manual Sorting	4 tons/hr	> 10 tons/hr > 100 M pieces/yr
Cost	High	\$0.04/kg	< \$0.03/kg
Accuracy	NA	> 99%	>99%
Sort Time/Piece	Manual > 30 sec	Low	< 100 ms

## PHASE I

**2014:** IL-XRF Feasibility Demonstrated for Al Series and Alloys

**2014:** 99% Accuracy Demonstrated in ARPA-E Double Blind Test

## PHASE II

**2015:** 1,000 lbs/hr Prototype Sorter Built for Algorithm Development

**2015:** 5xxx-6xxx Sorting Demonstrated at 30ft/min with 100% Accuracy

**2015:** Separation of Individual 5xxx and 6xxx Alloys Demonstrated  
e.g. 5182 vs 5754, 6022 vs 6111

**2016:** Air Jet Sorting Developed

**2016:** 1st Sorter for 5xxx-6xxx at 100 ft/min Installed at OmniSource

**2016:** Sorting of Old Cast Al Twitch Demonstrated at 100 ft/min in to  
319, 356, 360, 380-383

**2016:** Sorting Algorithms for Zorba and Brass Developed

**2016:** A Sorter for 2 tons/hr Twitch Designed and Built for 200 ft/min

**2016:** New XRF Sensor Developed for 5xxx-6xxx Sorting at 400+ ft/min

## PHASE III

**2017:** Development of Commercial Sorters (with OmniSource & TBD)  
Plans for 2, 4 & 10 tons/hr Ruggedized Sorters

## 4 Tons/hr Throughput Metal Alloy Sorter Installation at OmniSource



### FEATURES:

- 100 ft/min Belt Speed**
- 4 Lines**
- 8 Sorted Categories**
- Industrial Controls**

### CAPABILITY:

- 5xxx-6xxx Sorting**
- 5182-5754 Sorting**
- 6022-6111 Sorting**
- 360-380 Cast Al Sorting**

## Programmable 2 Tons/hr Metal Alloy Sorter



### FEATURES:

- 200 ft/min Belt Speed**
- Scrap size up to 4 inch Thick**
- 4-8 Sorted Categories**
- Touch Screen Controls**

### SORTING CAPABILITY:

- Al / Twitch : 2 tons/hr**
- Zorba : 4-5 tons/hr**
- Brass: 5-6 tons/hr**
- Recipe Maker-Mixed Scrap**

## Pre-Consumer Automotive Stamping Scrap Sort Accuracy

5xxx vs 6xxx	> 95%
6111 vs 6022	100%
5182 vs 5754	> 85%

## Post-Consumer Cast Aluminum Sorting

319	356	360	380+	Painted
27.3%	10.8%	16.3%	39%	3.2%

## HIGH PRIORITY SCRAP CATEGORIES

1. 5xxx-6xxx Pre-Consumer Automotive Stamping Scrap Sorting
2. Old Cast Twitch Sorting into 319, 356, 360 and 380.
3. 'Heavies' Sorting into Zinc, Copper, Brass, SS etc.
4. Zorba Sorting into Twitch, Zinc, Brass/Cu, and Zurich (SS)

## HIGH PRIORITY CUSTOMERS

1. Large Scrap Processing Companies with Multiple Yards
2. 300+ Automotive Shredders
3. 500+ Secondary Aluminum Producers
4. 10,000+ Aluminum Die Casters

## BUSINESS PLAN

Develop Commercial Sorters with 2, 4, 10 tons/hr Throughput

## BUSINESS STRATEGY

1. Partnership with a Large Scrap Processing Co (OmniSource)
2. Partnership with a Large Equipment Manufacturer (TBD)
3. Possibility of a JV for Wide Spread Commercialization