EIGHTEENTH ANNUAL

BiTS™

Burn-in & Test Strategies Workshop

March 5 - 8, 2017

**Hilton Phoenix / Mesa Hotel
Mesa, Arizona**

Archive – Session 7

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BiTS Workshop 2017 Schedule

Solutions Day

Wednesday March 8 - 8:00 am

Teaming Up

"Applying FEA Simulation for Test Interface Unit"

Jason Koh - Test Tooling Solutions Group

"BI RHINO Handling Solution"

Yaniv Raz- Intel Corporation

"Optical Device Testing at Wafer Level and Package Devices"

Carl Kasinski – Aehr

"Fan-in WLCSP Test Requirements"

Mike Frazier - Mike Frazier

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BI RHINO Handling Solution

Yaniv Raz
Intel Corporation

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Background

- MVE (Manufacturing Validation Engineering) is a group at Intel which is responsible for test development and validation of Intel microprocessors.

- MVS (Manufacturing Validation Solution) is a Team within MVE.

- The Team's scope involves delivering complete systems for the validation world, including automation systems.

- The RHINO handler was developed for the BI (Burn-in) validation ... validation labs in Intel.

BI RHINO Handling Solution

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Problem statement

- Burn In (BI) ovens are being widely used in Intel validation sites, for stress tests purposes.

- BIBs (Burn In Boards) are testing boards which are being loaded to the BI oven.

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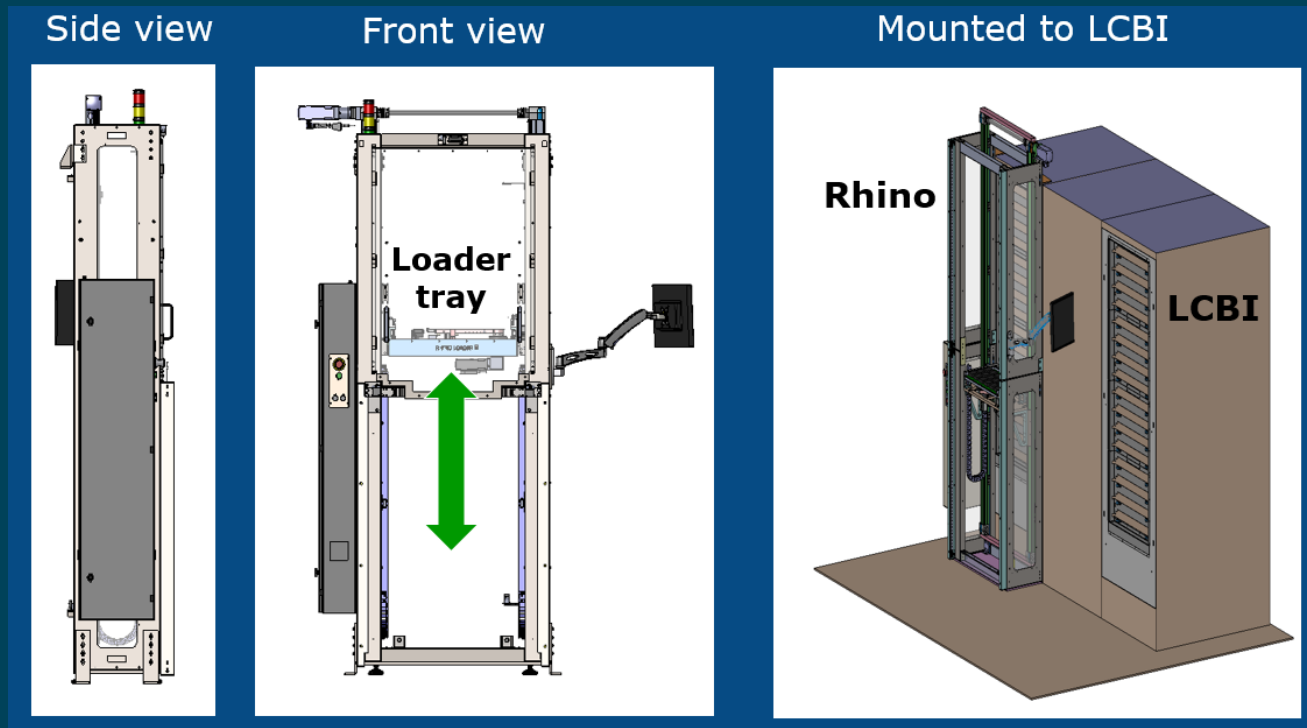
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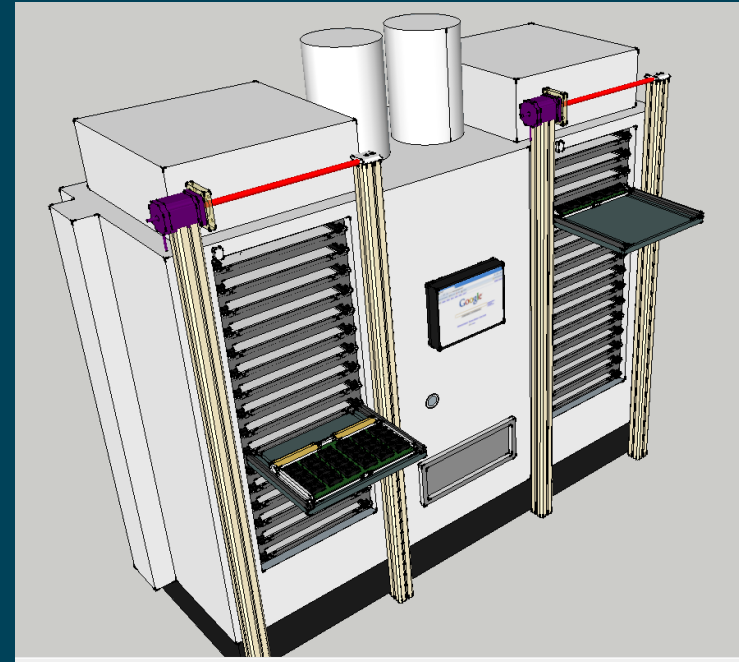
Problem statement

- BIBs are becoming heavier than before, with the latest product BIBs reaching 15 kg.

- The BI ovens includes 16 slots for BIB, while the upper ones requires a ladder to reach for loading.

- As manual loading and unloading the BIBs to the BI oven involves ergonomic hazards, a decision was taken to develop an ergonomic solution to eliminate the risk of operation.

BI RHINO Handling Solution

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Solution concept

- Main requirements for the RHINO design team:

  - Eliminate all the ergonomic hazards involved with Loading and unloading of the BI oven.

  - Design a lean footprint and easy to use handler

  - Be able to reach all 16 BI oven slots.

  - Be capable to work with any product related BIB.

  - The Handler can work on a single BIB mode, or on an automated mode (feeding from an 8 BIB cart).

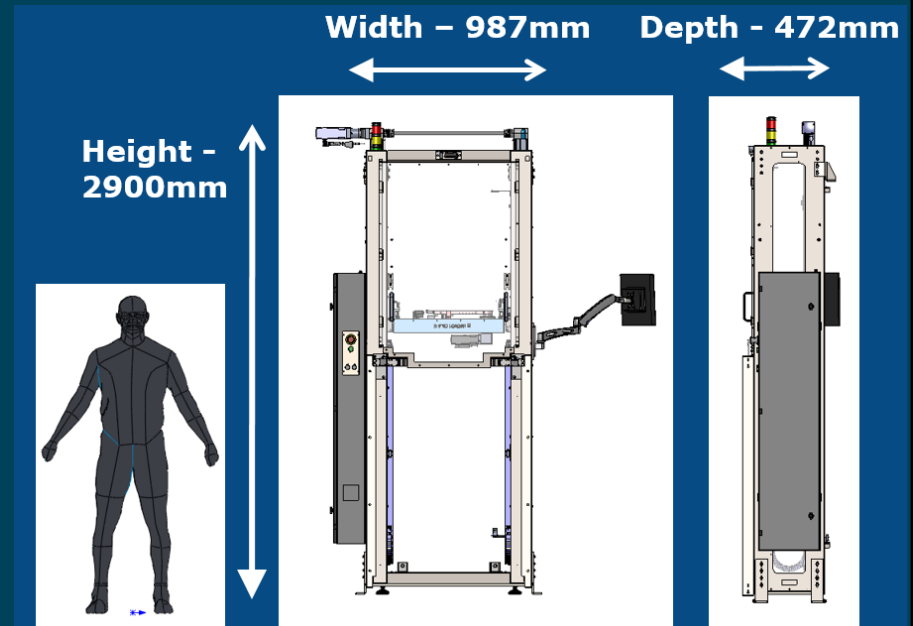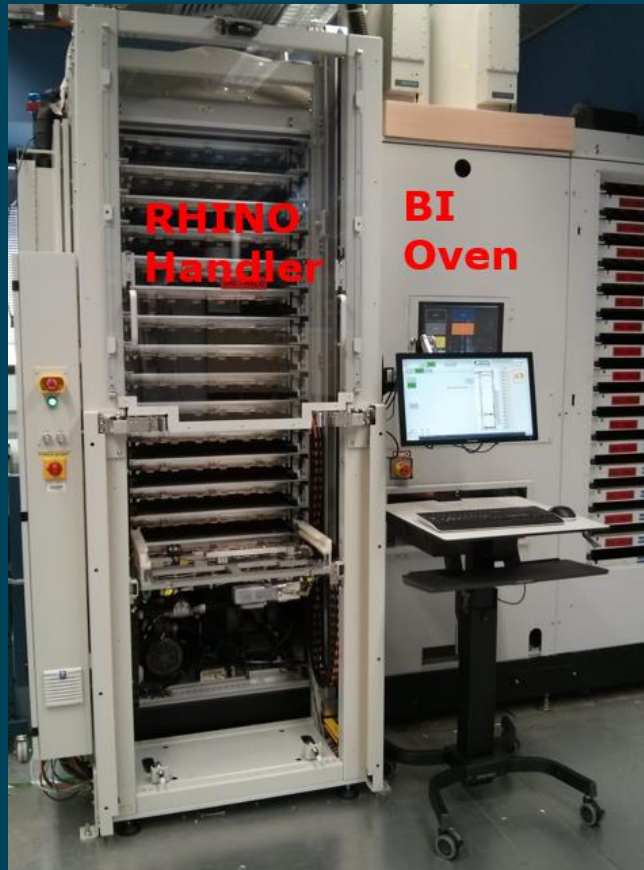 - System will includes a user friendly UI

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RHINO Handler Concept

- The RHINO Handler is docked to each BI oven side and serves 16 slots.

Lean Footprint

Height – 2900mm

Width – 987mm   Depth - 472mm

BI RHINO Handling Solution

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Mechanical Overview

- The Rhino design can be break down into 2 main mechanisms:

  - Lifter
    - Handles the up-down movements.
    - Carries the loader tray and reaches all 16 BI Oven slots
  - Loader tray
    - Hosts the BIB secured while lifted or lowered
   - Handles the loading and unloading in and out of the BI oven slots

BI RHINO Handling Solution

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Lifter

- Lifter mechanism is based on 2 coupled Festo electrical slides.

- Calibration - slots location mapping is done with laser sensors.


Festo slides
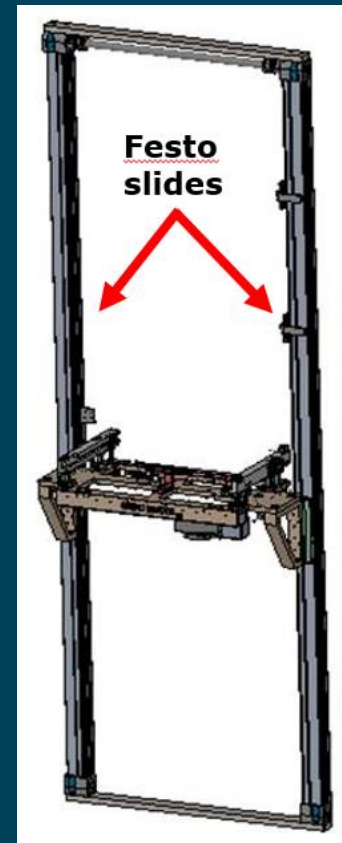
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Loader Tray

- Conveying mechanism is based on a rotating arm and a popup puller pin which are in charge of pushing and pulling the BIB in and out of the BI oven slots.

- Latching mechanism keeps the BIB secured in place while the lifter is transitioning.
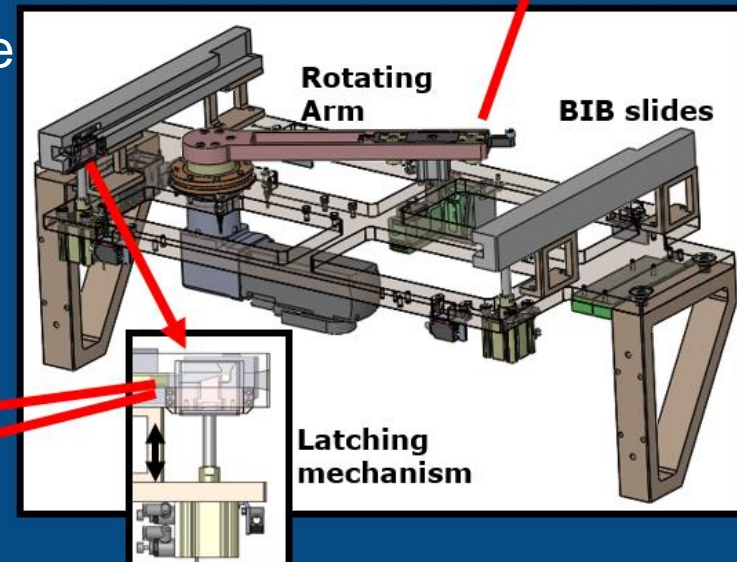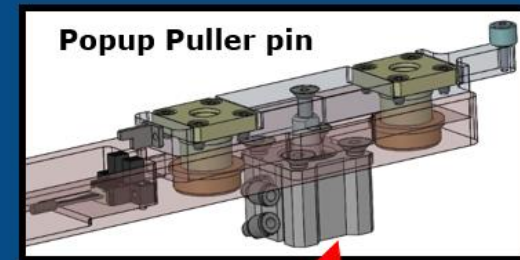
Safety Features

- All handler openings are covered by safety curtains, and are finger proof rated.

- Front side lower portion is covered with an optic curtain set (Level 4), while upper is covered by a transparent screen.

- "Person inside" detection is covered by floor horizontal optic curtain.

- While cart is docked, lower curtain is disabled to allow BIB transfers from the cart to the oven and vice versa.
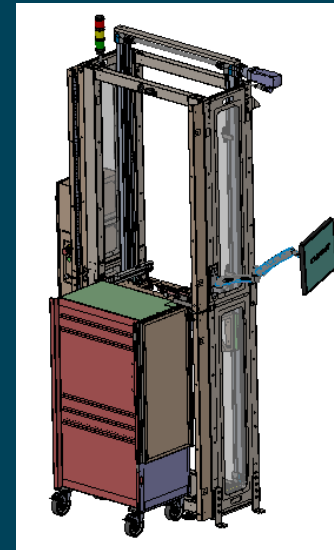
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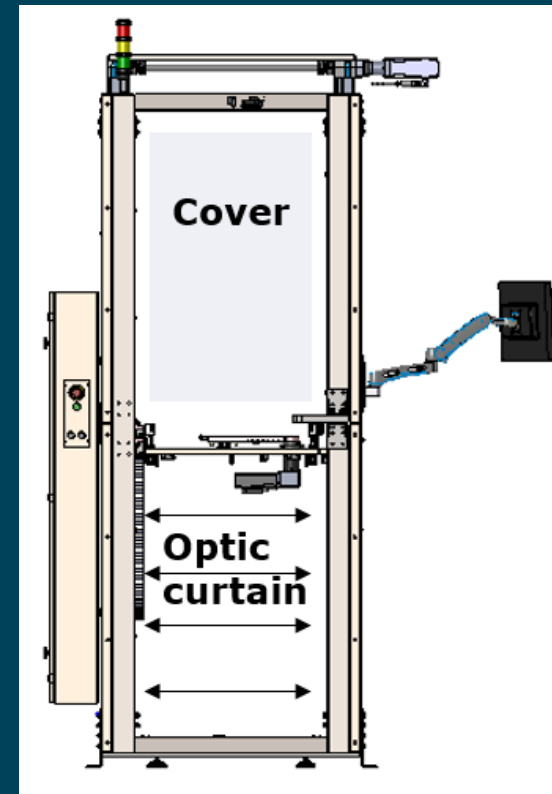
RHINO operational overview

- Operator is able to choose between 2 modes of operation:

Manual bib loading
(single BIB)
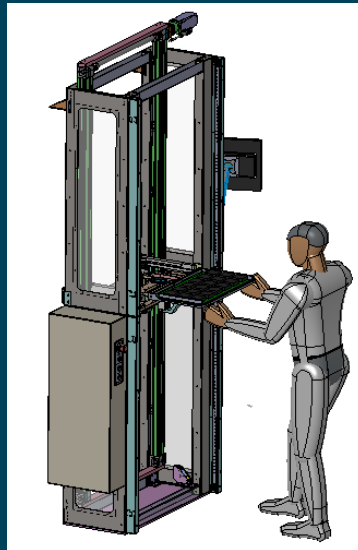
Automated loading
from a 8 BIB cart

Project Summary

- Project goal was fully achieved – eliminating all safety and Ergo risks involved with BI ovens loading and unloading.
  - Secondary goals achieved – Lean footprint, capability to work in Manual and Auto mode, higher capacity and speed, capable for any product.
- Budget target was met as well – machine cost for batches of 4+ is $60K.
- Customers satisfactory is high.
- Project team:
  - PM \ SE – Yaniv Raz
  - Lead Mechanical designer – Adi Klein
  - Mechanical designer (student) – Andrey Evgraphov
  - Electrical \ SW design – Shaniv (External vendor)
- Duration - from initiation to 1st article testing ~18 months.

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Videos

Video 1 – Board being unloaded

Video 2 – Board being loaded

Video 3 – Slot Change – lower oven

Video 4 – Slot Change – Higher oven

Video 5 – Arm Actuations

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