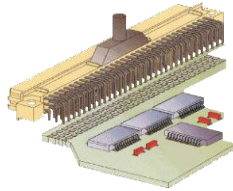


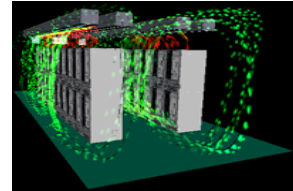
Electromechanical Design Challenges



Small enclosures impact placement, keepsins, keepouts



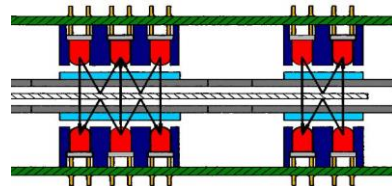
Connectors and mounting holes must move together



Analyzing multiple boards together for thermal considerations



Assembly screw shorting electrical connection on PCB



Alignment of optical sensing devices

3

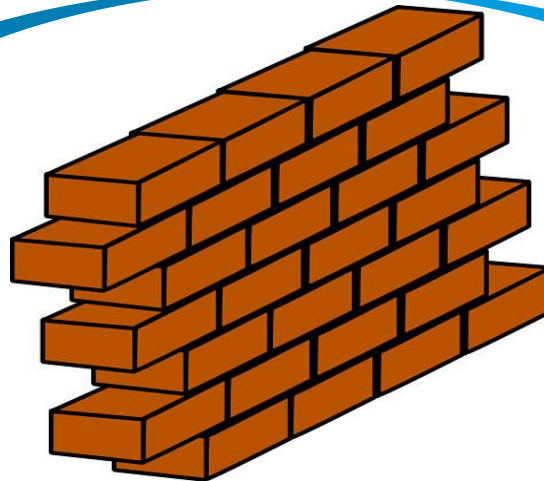
3

Current IDF Collaboration Process

IDF shared data dump



PCB Layout

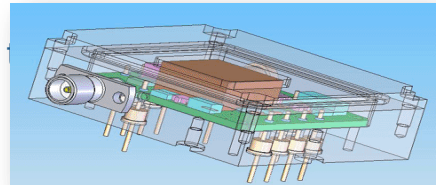


Mechanical

Designers need ability to easily collaborate with each other!

4

- **MCAD team needs ECAD component placement information for:**
 - Form and Fit Studies
 - Thermal Analysis
 - Weight, Stress, Spark analysis
 - Renderings for Marketing
- **Sharing of initial board outline between domains**
 - Typically MCAD owned, enclosure rules over all
- **Sharing Critical object placement from MCAD**
 - MCAD owns connector locations, switches etc.
 - Boundaries, keep-in/keep-out
 - Mounting Holes



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5

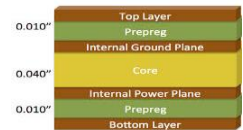
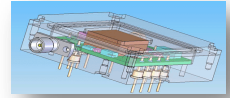
- **ECAD team needs MCAD information to:**
 - Understand enclosure restrictions, keep-out areas and mechanical part placement
- **Sharing of initial board outline between domains**
 - Typically MCAD owned, enclosure rules over all
- **Sharing Critical object placement**
 - MCAD owns connector locations, switches etc.
 - Boundaries, keep-in/keep-out
 - Mounting Holes



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6

- Designers need ability to *easily* collaborate with each other
- Engineers and designers are typically trained for ECAD or MCAD, not both
 - Difficult for one side to easily see what has changed on the other
 - Current collaboration processes are 'all-or-nothing'
- Change history documentation and preservation
 - Emails, PDF's and PPT's are lost after implementation
 - Need ability to electronically document and archive update acceptance or rejection



How can this process be streamlined to enable fewer errors in the least amount of time?

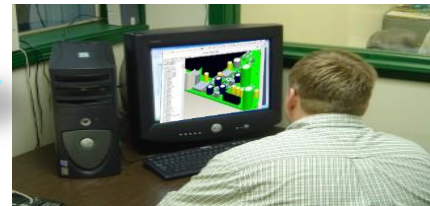
7

IDX (Incremental Data eXchange) Format

- Collaboration via incremental data exchange (IDX) reduces time, effort and miscommunication..



ECAD Layout



PTC Creo Parametric

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9

ProSTEP iViP Project: ECAD/MCAD-Collaboration

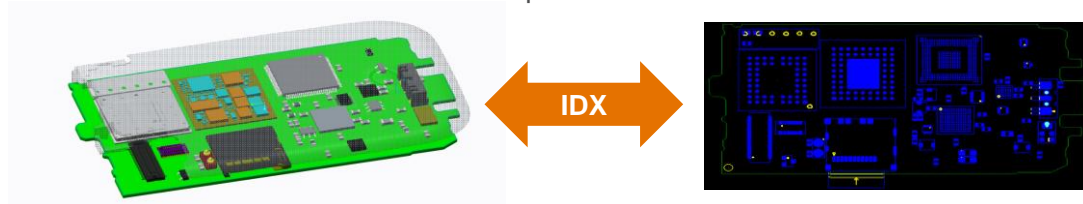
Mission in year 2006: Enabling mandatory collaboration between ECAD and MCAD domains

- Process-oriented / Standard-based
- PTC and ECAD Vendors have been driving this group from inception.
 - Today almost all major CAD vendors are involved
- STEP affiliated collaboration model definition
 - First data model based on STEP AP210 and AP214 entities was designed in 2006
 - Made available as XML schema for implementation
- Current Version PSI 5 Recommendation 3.0 (IDX)
 - Available at www.prostep.org

10

- **Benefits of IDX over IDF**

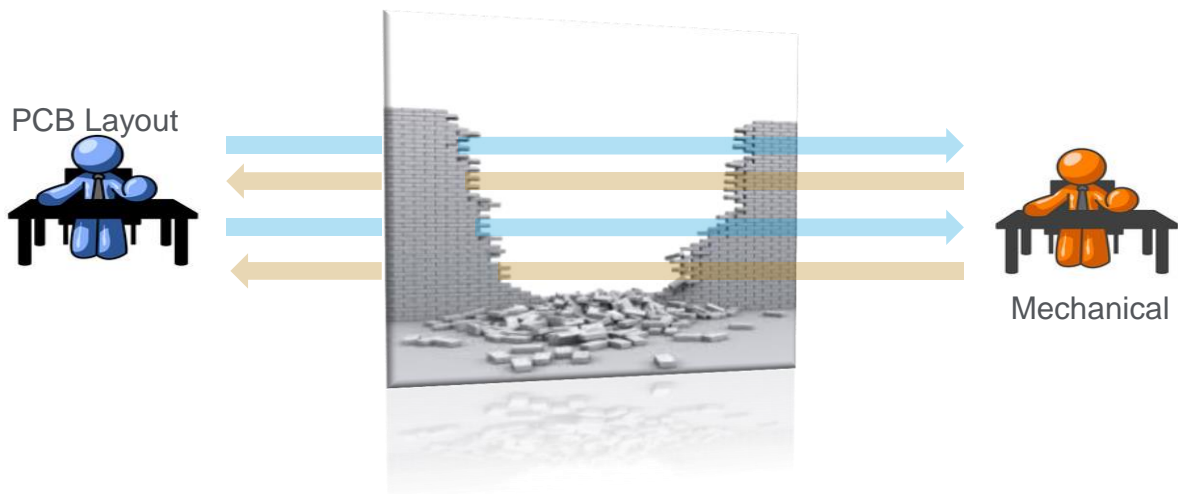
- **Incremental** exchange of only what changed
- Allows for unique ID's on holes, regions, and components
- Built in History
- Built in Notes and Accept/Reject
- Single file (IDF is two)
- Go forward format for vendors to expand



11

IDX Collaboration Process

IDX, incremental files galore

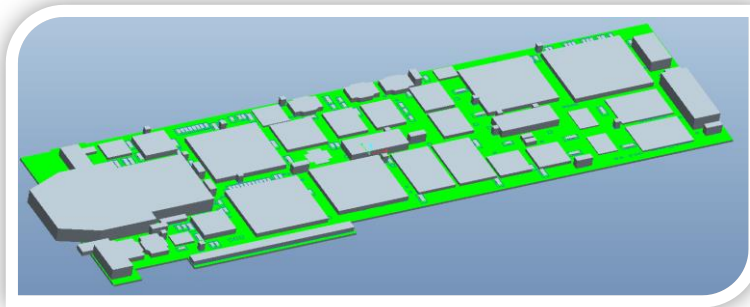


12

Common Use Cases

Simple ECAD-MCAD Setup for Parts

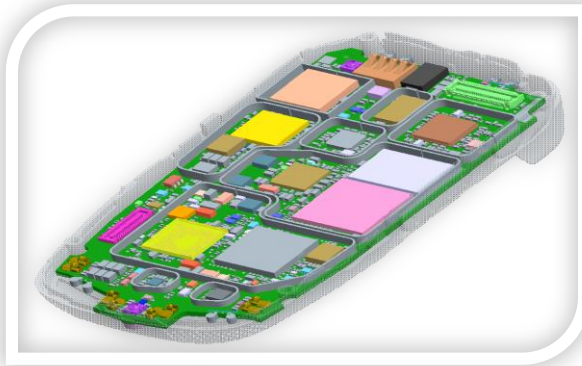
- No MCAD parts modeled.
- Rely on ECAD to send IDF or IDX to MCAD and use height data.



Average ECAD-MCAD Setup for Parts

PTC Live
Global

- All major parts modeled
- Parts can be modeled with pin 1 graphical indicators for alignment
 - Connectors

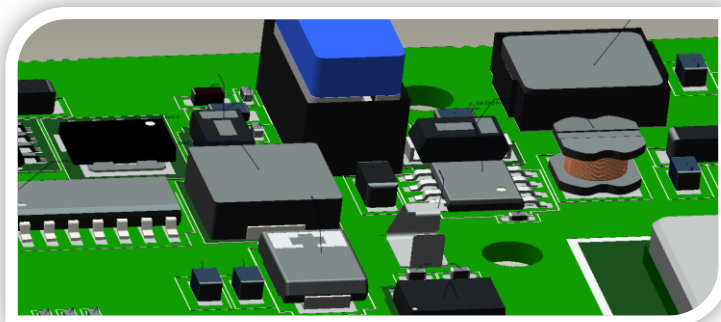


15

Advanced ECAD-MCAD Setup for Parts

PTC Live
Global

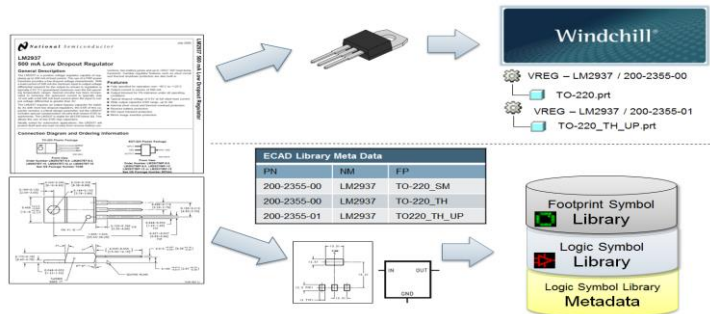
- Every last detail of a part including pins/pin pads modeled
- Part Family Tables



16

Library Management is key

- ECAD and MCAD parts need to be aligned and managed prior to collaboration
 - Proper NPI (New Part Introduction) process
 - Ensures Rotation and alignment of ECAD and MCAD parts



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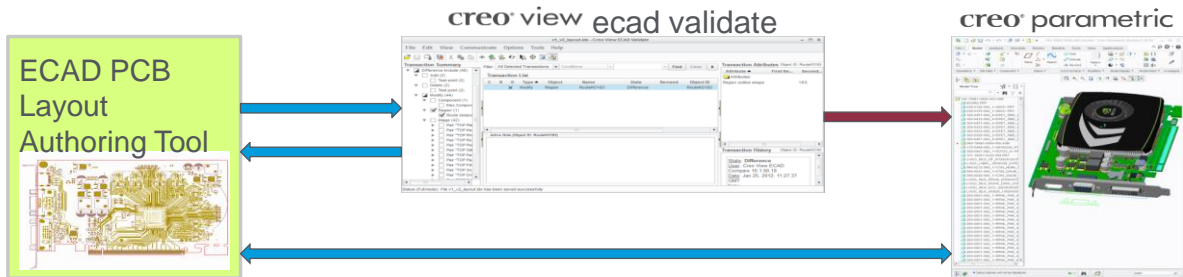
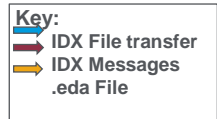
17

Collaboration Data Flow

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19

- Board Baseline IDX exchange
- ECAD Incremental proposal
 - Review in Validate
 - Preview/Accept/Reject
 - Send response back to ECAD



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20

Demo

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23

PTC Creo 3.0 and IDX

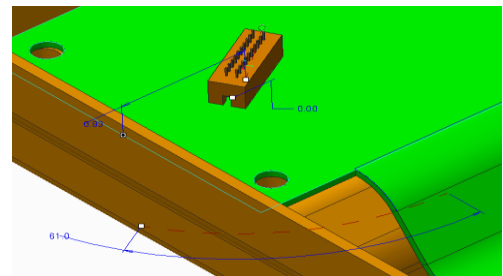
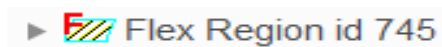
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24

PTC Creo Rigid Flex Design

Flex Board Features

- Areas
 - Flex Region
 - Manually defined by user
 - Bend Areas
 - Automatically created and communicated in IDX
- Bends
 - Bend Lines
 - Automatically created and communicated in IDX
- Component Placement
 - Select top or bottom of board
 - Component is placed onto board
 - Drag handles provided
 - Dynamic movement
 - » Translational and Rotational
 - Define constraint references



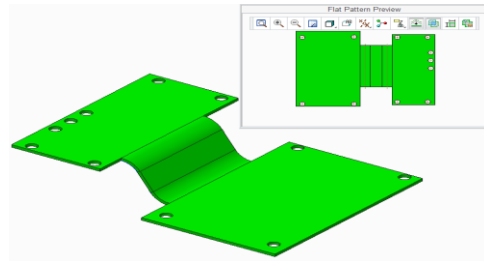
Forward looking and subject to change without notice

25

Manual Flattening Capabilities

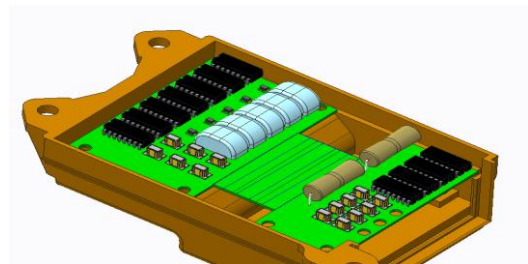
- **Board Part**

- Flatten Preview
 - Check for overlaps
- Flatten
 - All features flatten with board
 - Holes, areas, etc



- **Assembly**

- Flatten in the context of the assembly
 - All Components and Board Features flatten
- Flatten standalone PCB assembly
 - All Components and Board Features flatten



Forward looking and subject to change without notice

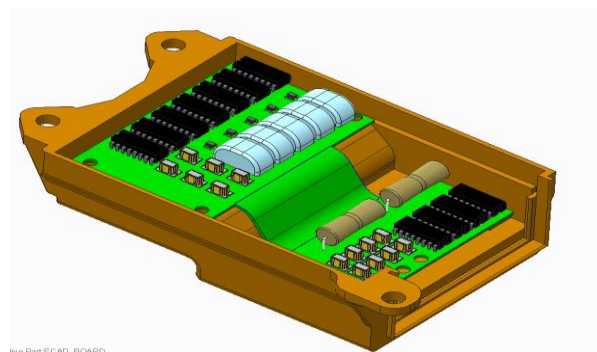
Collaboration capabilities and restrictions

- **Import, Export Capabilities**

- Board is flattened under the hood
 - IDX Export
 - Board outline
 - Component placement
 - Bend areas
 - Bend line
 - Flex areas
 - Ecad areas
 - Holes
 - IDX Import
 - Component placement
 - Board outline changes
 - » Update Board thickness
 - Bend changes
 - Flex areas
 - Component's placed on bends
 - Ecad areas
 - Holes
 - » On bends

- **Rigid Flex Future Projects**

- Multiple thicknesses support planned
- Board outline changes from ECAD



Forward looking and subject to change without notice

- **PTC Creo Parametric:**
 - Additional Object Support:
 - User Defined Areas
 - Copper (ECAD->MCAD) one way
 - Board Outline Cuts/Slots
 - Pin #1 support
 - Associate pins and components
 - Multi-thickness boards and layer stackup
 - Flow support:
 - Ability to Edit while in Collaboration mode
 - Allow for a .prt to be placed in MCAD that is ready for IDX export (no manual input)
 - Enable Windchill to store IDX files coming to/from MCAD per design with minimal user clicks
- **Overall Enhancements:**
 - Merge IDX files (response + proposals)
 - Bring Validate functionality into PTC Creo View and PTC Creo Parametric
 - PTC Windchill as an IDX “broker”
 - Notification of IDX file updates per design to both ECAD and MCAD users

- **ECAD-MCAD Collaboration using IDX enables you to:**
 - Exchange data on only what has changed
 - Easily see both graphically and textually what has changed
 - Accept or Reject proposed changes
 - Reduce need for ‘manual’ communication methods
 - Communicate electronically via the IDX file
 - Retain collaboration history and archive with the design

- Your feedback is valuable
- Don't miss out on the chance to provide your feedback
- Gain a chance to win an instant prize!
- Complete your session evaluation now

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