

# Presentation Outline

Introduction

Building Overview

Proposed Redesigns

Load Reduction

Solar PV Analysis

DOAS & Chilled Beam Analysis

Floor-to-Floor Height Reduction

Chiller Plant Analysis

Conclusion



Zachary Polovchik  
Mechanical Option  
Advisor – Dustin Eplee

The Pennsylvania State University  
Department of  
Architectural Engineering



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Introduction

**Building Overview**

*Building Statistics*

Existing Mechanical Systems

Proposed Redesigns

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Use: Office/Courthouse

Cost: \$224 Million

Delivery: Design-Build

Construction Start: May 2009

Construction End: May 2012



Location: Downtown Jacksonville, Florida

Size: 798,000 s.f. with 7 Levels above grade

Zachary Polovchik  
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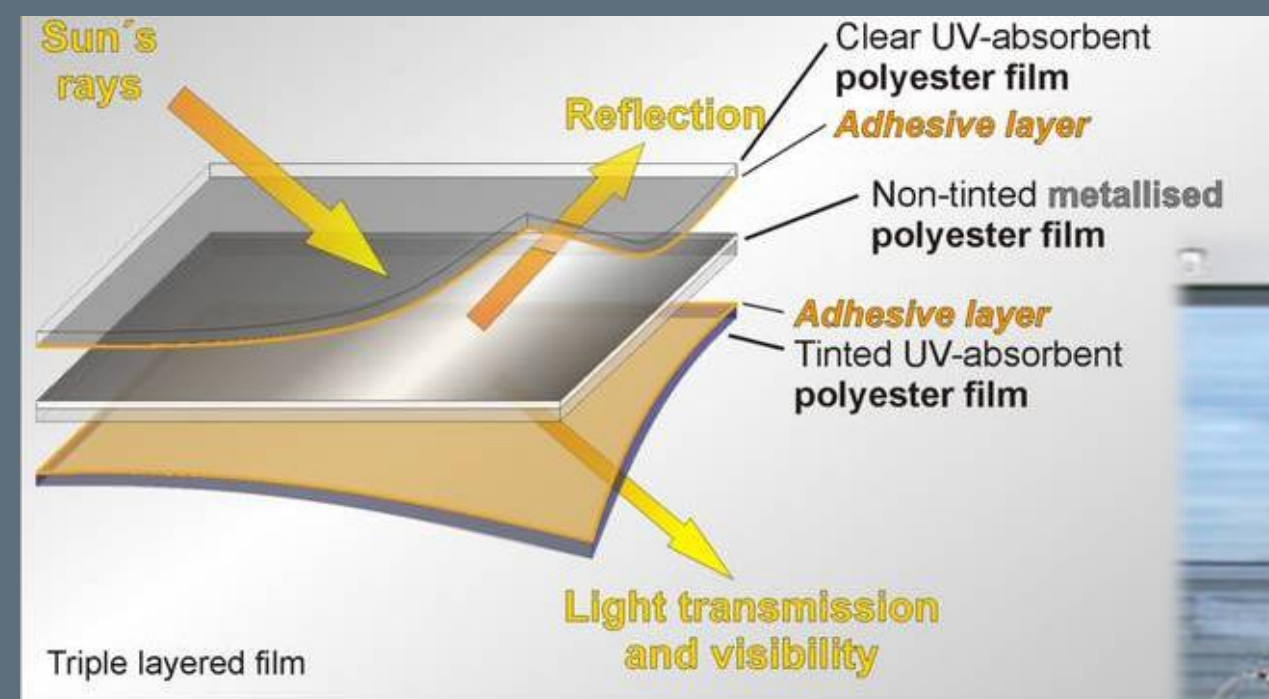
DUVAL COUNTY UNIFIED COURTHOUSE FACILITY

The Pennsylvania State University  
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- Introduction
- Building Overview
- Proposed Redesigns**
  - Load Reduction**
    - Existing Loads
    - Internal Shading Technology**
    - New Loads
    - Economics
  - Solar PV Analysis
  - DOAS & Chilled Beam Analysis
  - Floor-to-Floor Height Reduction
  - Chiller Plant Analysis
- Conclusion



\*Images Courtesy of Multifilm® website



- Normal blinds trap direct solar radiation between glazing and blind's surface
- Multifilm® blinds use multiple films, with a thin layer of reflective aluminum
- Allows solar radiation to be reflected back out glazing before it turns into heat in the trapped space
- Allows enough visible light in and out to allow for glare-free natural lighting and views out

- Improves SHGC and U-Value of glazing system
- For ease of modeling the solar radiation reduction benefits, the glazing system's SHGC was modified instead of utilizing an internal shading model
- The Multifilm® *Film-Façade-Systems* product has been chosen for the DCUCF due to the large glazing areas
- This system allows for an electrically motorized operation system to adjust the vertical length of the blind
- The control of these internal shades will use photosensors on each main façade of the building to control the motors

Space saved for drawing of "solar radiation reflections with Multifilm shading device"