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# **An Object-Oriented Architecture for the ICO Payload Control System**

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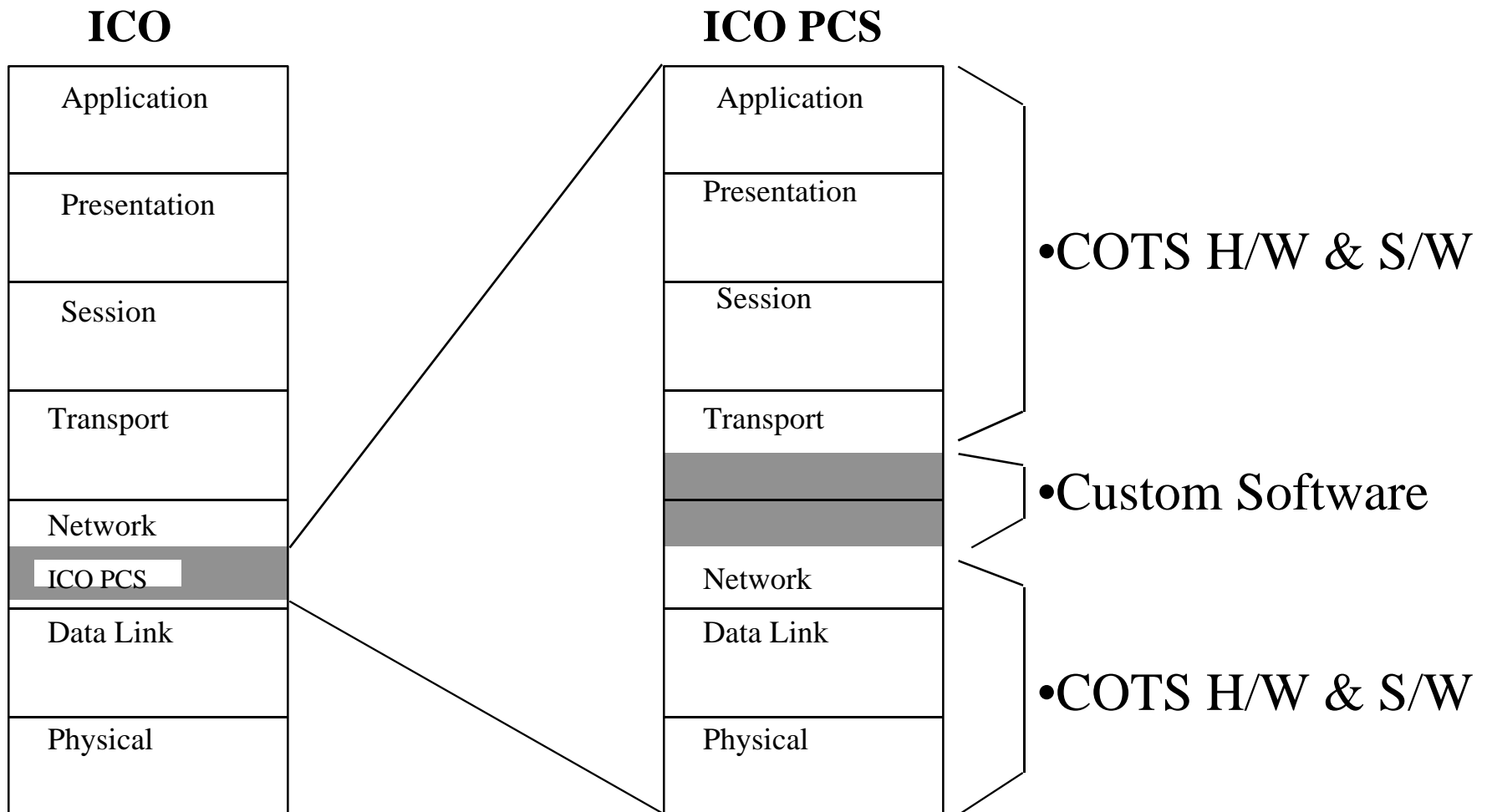
# Overview

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- What is ICO?
  - ICO is a MEO based global mobile telephony system.
  - [www.ico.com](http://www.ico.com)
- What is the ICO Payload Control System?
  - Provides transparent delivery of payload commands to the satellite constellation across a distributed ground system.
    - Operator Interface
    - Autonomous Commanding
  - Tracks the payload via telemetry



# Context of ICO PCS Custom Software Development





# Why OO for ICO PCS?

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- **OO is being used for the custom software for ICO PCS.**
- **Why OO rather than procedural?**
  - **ICO expects flexible ground station software.**
    - **OO imposes protocol between software components**
  - **Ability to use COTS C++ libraries greatly increases the maturity of our product**
    - **Standard Template Library**
    - **RogueWave Libraries**

- **Used Integrated Systems Design Methodology (ISDM), developed by Dr. Dan Port of USC.**
- **Key analysis questions:**
  - **What are the components of our system?**
    - **Command sources?**
    - **Spacecraft?**
  - **What are our responsibilities as a subsystem?**
    - **Interactions with the ground system?**
    - **Interactions with operators?**
    - **Interactions with the spacecraft?**
  - **How do our responsibilities map to the components of our system?**

- **We selected a CASE tool using these criteria:**
  - Concurrent design
  - OMG UML 1.0 compliance
  - Ease of use
- **CASE tool selected: ObjectTeam by Cayenne.**
  - [www.cayennesoft.com](http://www.cayennesoft.com)
- **Key design questions:**
  - What additional classes or code must we create to implement our analysis?
  - How can we break development into manageable units?
  - How do we develop shared code (e.g. inheritance)?



# Acronyms

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- **CASE - Computer Aided Software Engineering**
- **COTS - Commercial Off The Shelf**
- **ICO - Intermediate Circular Orbit**
- **ISDM - Integrated Systems Design Methodology**
- **MEO - Middle Earth Orbit**
- **OMG - Object Management Group**
- **OO - Object Oriented**
- **PCS - Payload Control System**
- **UML - Unified Modeling Language**