



# Virtual Project Teams

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# Program Overview

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## Program Scope

- Aerospace and Defense Industry
- 2 Phases:
  - System Acquisition and ISS Set-up;
  - In Service Support (ISS) (Steady State Operations).
- ISS scope:
  - Includes 11 System Support Projects (SSP's);
  - Includes over 40 different Configuration Items (CI's);
  - Performance Based Contract;
  - Set up phase ready for use in August 2008;
  - ISS phase will support the system until 2024.
- The Integrated Information Environment (IIE) includes 20 different enabling systems to support the System over a 20 year period.

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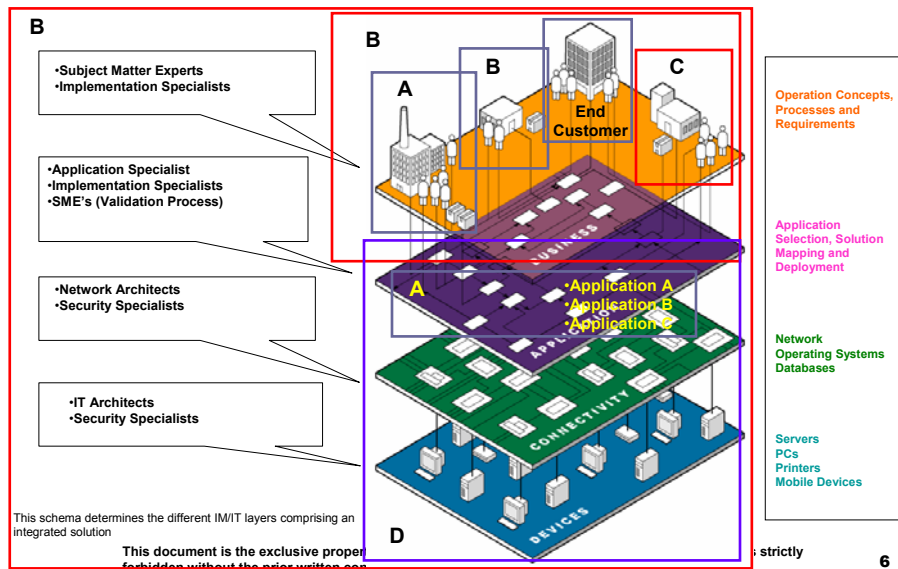
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# IIE High Level Scope

- **Geographical Scope:** 6 locations across Canada, 4 different business partners managing environments (US Prime Contractor and 3 Canadian Sub-Contractors);
- **Users:** 9 different classes of users, supporting approximately 850 users (bilingual community);
- **Networks:** 2 networks including a secure and a “highly” secure domain;
- **Applications:** 20 applications including 18 Commercial-off-the-shelf (COTS) solutions, 2 custom applications:
  - Best of breed versus ERP solution.
- **Availability:** High availability is required for all IIE components.

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# Support System Project Team



# Standards and Methodologies

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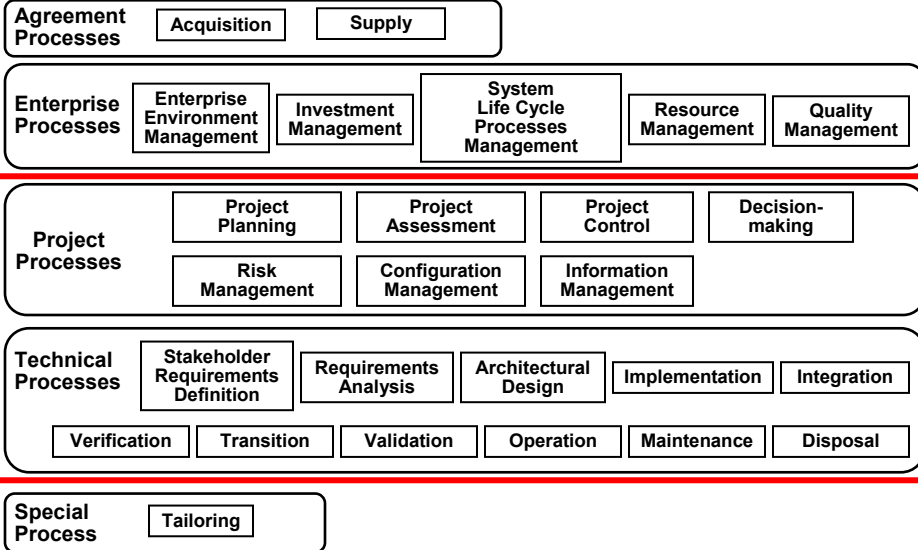
## Program System Engineering Approach

- Engineering processes in compliance with ISO/IEC 15288 standards
  - Includes a tool set of design documentation;
  - Includes a business process and interface definition methodology.
- The IIE Project has deployed an implementation methodology compliant with the IEEE 12207 standard for software development:
  - Includes a tool set of design documentation;
  - Includes deployment of the IBM Rational Unified Process <sup>TM</sup> (RUP Methodology).

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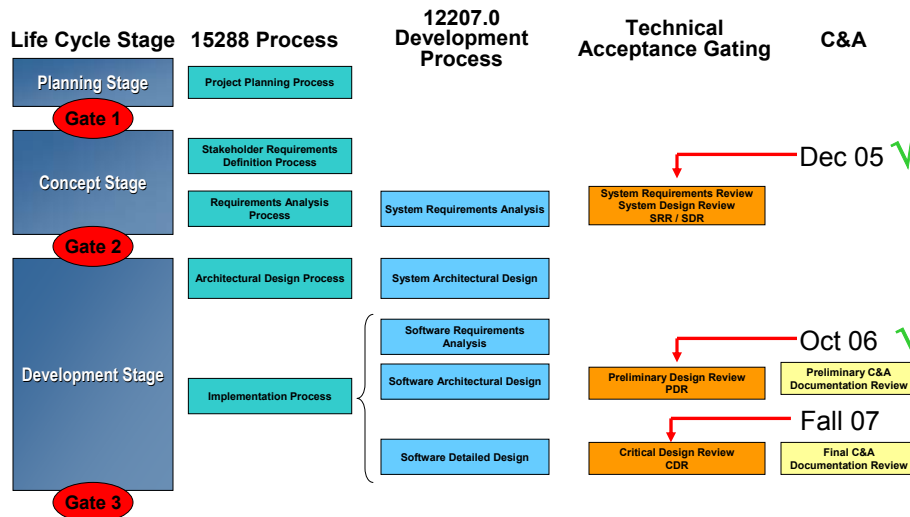
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# System life cycle processes ISO/IEC 15288



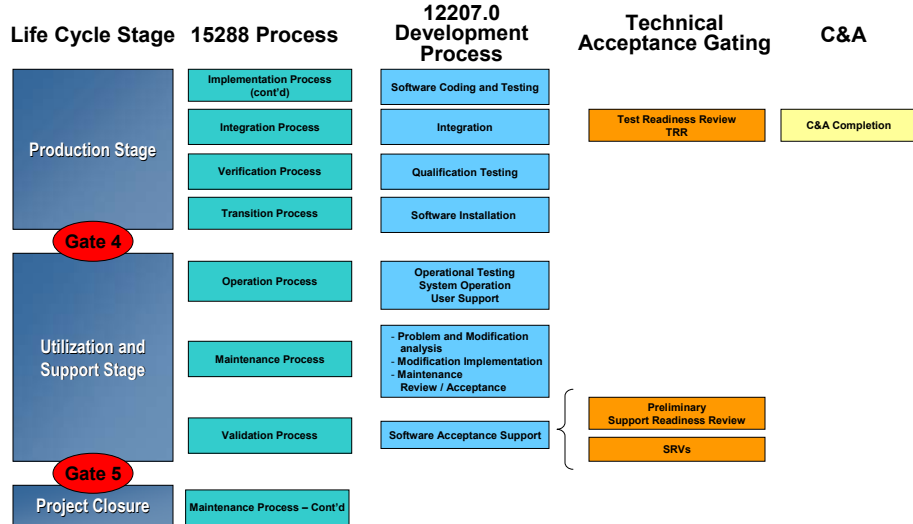
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# Standard Integration



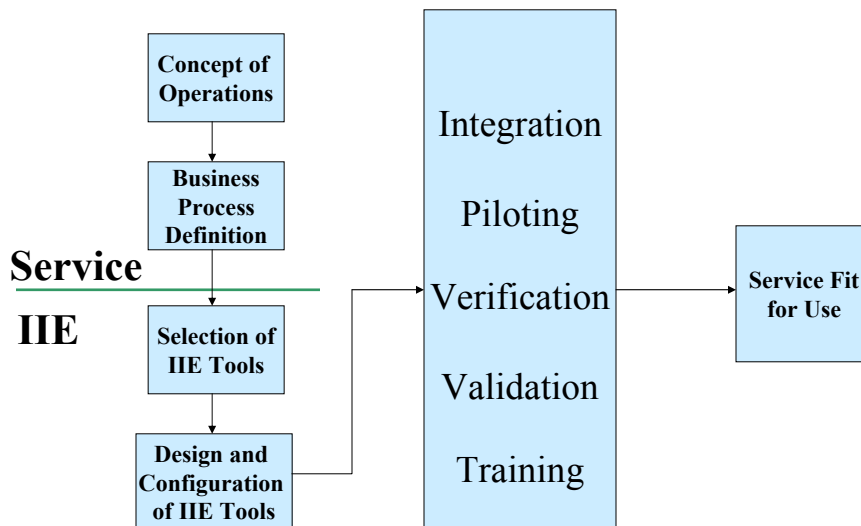
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# Standard Integration (cont'd)



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# Service Centric Methodology



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# Program Challenges

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## Critical Success Factors

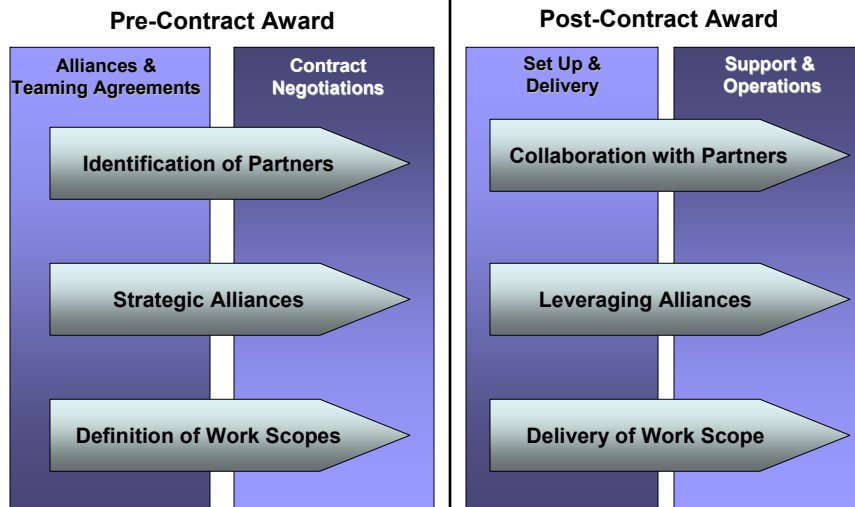
*Industry's Best  
Practice Project  
Management Critical  
Success Factors*

- 1) Senior management commitment and support
- 2) Clearly defined requirements and vision
- 3) Realistic Timeline
- 4) Organizational readiness
- 5) Dedicated and capable resources
- 6) Change leadership
- 7) Partnership commitment, proven approaches and strengths in technology and change
- 8) Clearly defined roles and responsibilities

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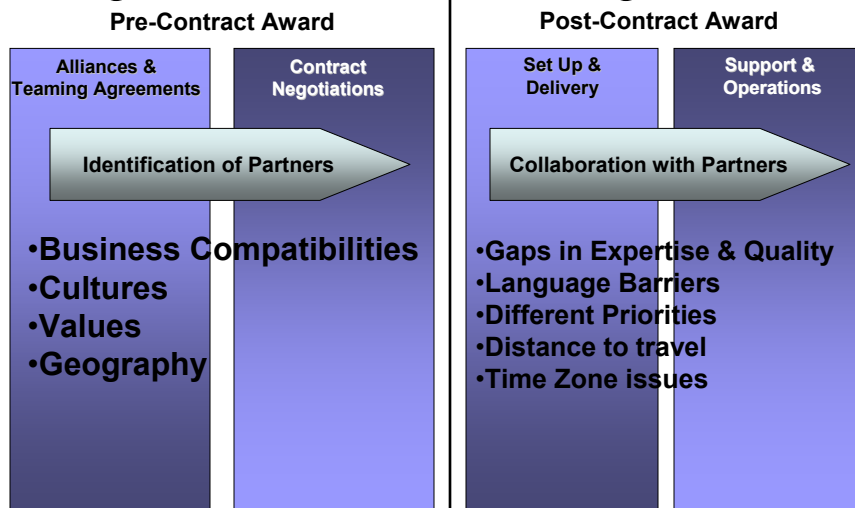
# Program Phases



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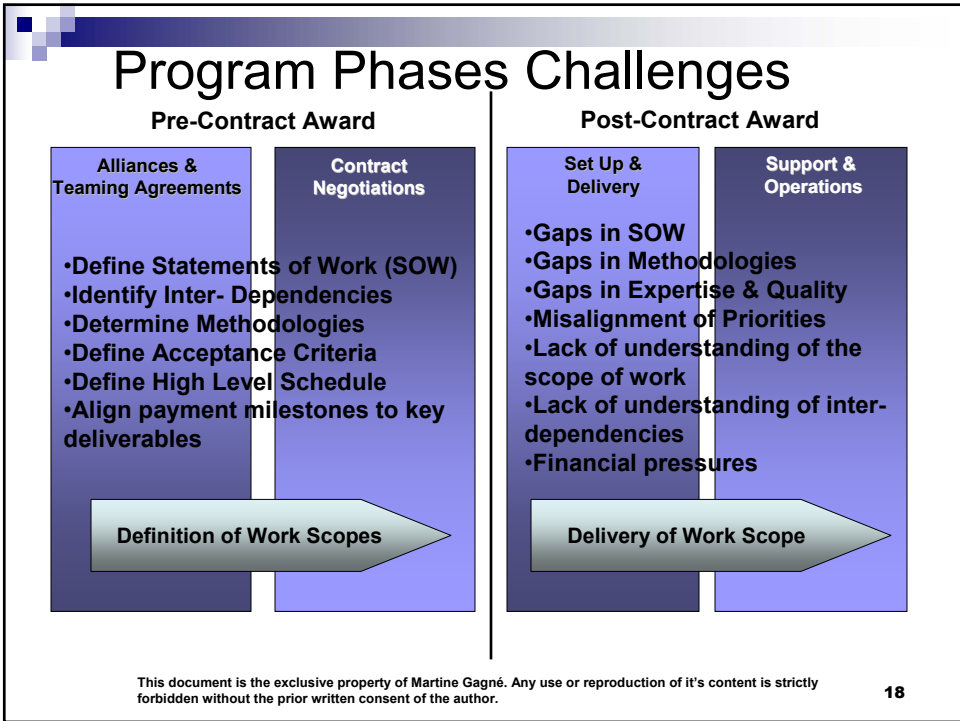
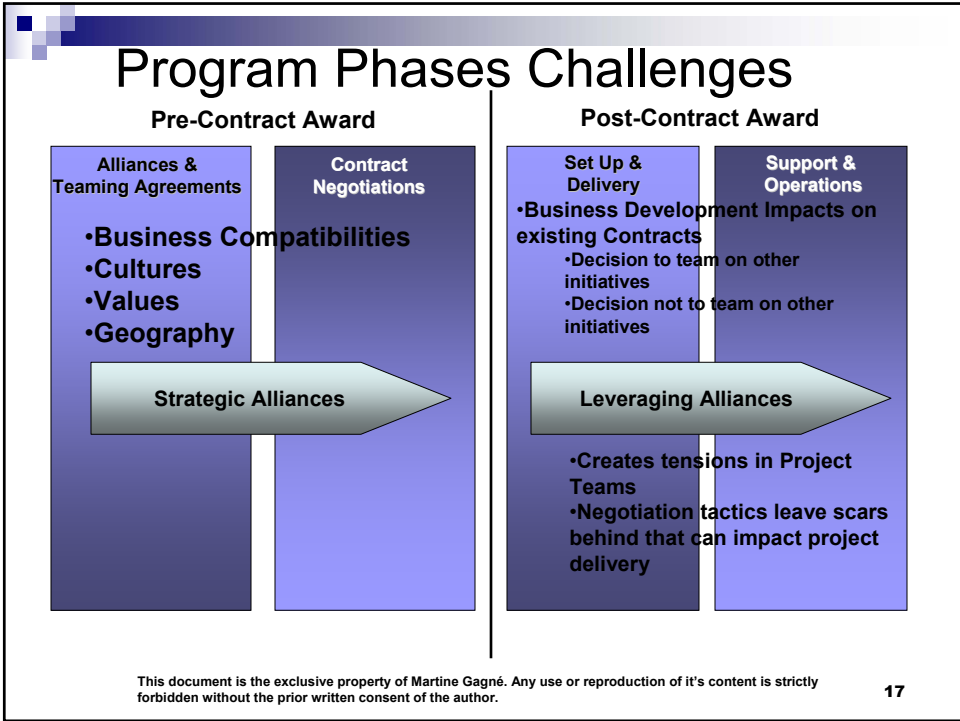
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# Program Phases Challenges



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## Process Ownership

- Successful implementations are based on:
  - Strong sponsorship;
  - Clear roles and responsibilities;
  - Identification of key process owners.
- Notions of Process Ownership in a virtual team are:
  - Different from partners to partners;
  - Non-existent in some organizations;
  - Extremely difficult to exercise when processes travel across different organizations;
  - Temporary in nature during set up as some the “real” process owners are not yet in position.
- Lessons Learned:
  - When project is “service” centric, insist on a common understanding of the Process Ownership concepts and responsibilities before contract award;
  - Interrupt activities if Process Ownership is deficient.

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## Organizations

- Understanding levels of authority is difficult in a virtual team context:
  - True Authority
    - Contractual Authority;
    - True Program Authorities;
  - Perceived Authority
    - Window dressing positions to deal with partners and customers.
- Lessons Learned:
  - Strive to understand customer and partners' organizational structures and constraints;
  - Validate levels of authority by asking formal approval of minutes and documents.

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## Reorganizations and Turn Over of Personnel

- In long term projects, progress can be severely hampered by:
  - Turn over of personnel;
    - Particularly true of large infrastructure type Contracts.
  - Reorganizations that destabilize established cross-organizational working groups and teams;
  - Departure of key resources that hold critical program information.
- **Lessons Learned:**
  - Formally document action items, decisions and minutes of meetings; make use of a Decision Analysis Record (DAR) process amongst virtual partners;
  - Obtain partners organizational charts and brief them within respective organizations.

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## Managing Resources

- The larger the team, the more difficult it is to efficiently manage resources.
- **Lessons Learned:**
  - Avoid reacting to crisis by inviting the whole world to meetings at the same physical location;
  - Use Webex and video-conference facilities;
  - Isolate design and technical teams from program events and activities;
  - Avoid over-participation to working groups:
    - Insist on pre-agreed meeting objectives and expected outputs;
    - Include partners when it is necessary;
    - Include customer when it is necessary.

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## Integration Master Schedule

- Integrating schedules from various partners into one Master Schedule works in principle but not in practice:
  - Different tools generating file format issues;
  - Confidentiality of scheduling data (cost and resource allocation);
  - Critical path analysis works initially when the project is aligned but not in the long run;
  - Synchronization of different “period end” across various partners.
- Resulting in parallel tools being developed despite the set up of state-of-the-art applications and complex reporting mechanisms.
- Lessons Learned:
  - Agree on selection or non-selection of common scheduling tools before contract award;
  - Establish granularity of reporting early on in the program – Keep it as high as possible at the Integrated Master Schedule level;
  - Agree on reporting periods;
  - **Not convinced that an elegant solution exists!**

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## Risk Management

- Integration of Risk Management concepts is a challenge across a virtual team because:
  - Different levels of business maturity at partner level;
  - Different notions of what constitute a risk;
  - Risk Board integration becomes onerous, complex and inefficient
  - Risk Board meetings are used to as an escalation process which defeats the purpose
- Lessons Learned:
  - Agree early on in the Program on definition of Risk Management concepts and rules of engagement
  - Establish a rigorous process to follow up on mitigation plan action items. It works and you can manage the work!!

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# Configuration Management

- Integration of CM concepts is a challenge because:
  - Organizations naturally want to retain their respective CM processes;
  - Integration of a change process (CCB) across multiple organizations in a virtual concept has to assume some give and take that organizations are not necessarily prepared to support;
  - Lack of integration at the CM level can make a Program fail.
- Lessons Learned:
  - The CM Process is one of the most critical process of a given Program and the basis for it's operation in an integrated mode should be agreed to prior to contract award.
  - Key Process Owner should be identified by name and responsibilities very early on in the Program

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# Managing Approval Cycles

- Approval of life cycle data and certification documents in a multi-level contract context can bring a Program to a halt:
  - Compounded review cycles leave no time for design activities;
  - Quality suffers;
  - End customer has little to review data prior to major design gates;
  - Key deadlines can be missed.
- Lessons Learned:
  - Define acceptance process prior to contract award;
  - Set up pro-active and iterative review cycles internally and externally;
  - Use webex and video-conference facilities to enable review;
  - Document comments and how they are being addressed to ensure closure of issues and continuity.

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## Performance Management

- Performance Based Contracts are a challenge in a virtual team context because:
  - Definition of attributable causes of failure makes it very difficult to design;
  - Management of attributable causes of failure makes it very difficult to implement in a day-to-day operation.
- Lessons Learned:
  - Keep it simple!

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## Other Program Challenges

- Pressure to Deploy an Interim Solution for Collaboration can burn up a lot of "unplanned" energies:
  - Setting up before Set up
    - Engaging funds before Contract Award
    - Understanding the requirements and timeline
    - Setting up processes and tools without design framework in place
  - Collaboration Canada/US
    - Agreeing on an "Enterprise" concept across contractual boundaries
    - Legislation and In country government constraints
    - Intellectual Property Management
- Lessons Learned:
  - Define precisely what capabilities are required in the infancy stage of the Program to support design and set up activities before contract award.

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# System Engineering Challenges

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## Design and Delivery Challenges

- Interpretation of Standards;
- Alignment & Deployment of Methodologies;
- Alignment of Gating Processes and Design Reviews.
- Lessons Learned:
  - Consider maturity and alignment of design approaches during partner selection process via compliance statements;
  - Agree on interpretation & deployment of standards prior to contract award.

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## Integration Challenges

- Management of an Integration Committee with members from various companies;
- Definition of interfaces that travel across multiple companies.
- Lessons Learned:
  - Establish clear roles and responsibilities;
  - Define and ensure congruence to Committee Charter
  - Define levels of authority and escalation path;
  - Assign core design team (limited group) to define high level integration concepts early in the Program to provide guidance for design of lower level interfaces;
  - Avoid “design by committee” events:
    - Use Iterative design approach to evolve complex processes and present progress to the review committee for comments.

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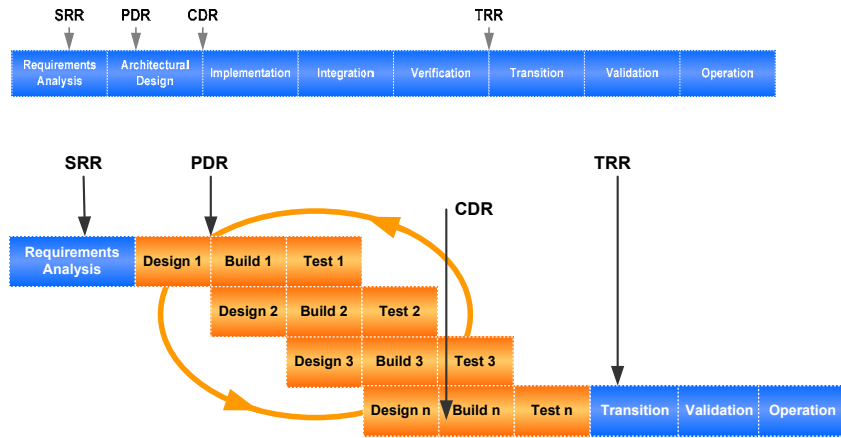
## Validation & Acceptance Challenges

- Deploy efficient Validation process;
- Achieve Acceptance of Product by End Customer.
- Lessons Learned:
  - Ensure that all parties agree on the definition of validation concepts;
  - Develop and obtain approval of validation scenarios by end customer early in the program;
  - Strive to combine validation exercises to avoid multi-level validation:
    - Requires a lot of buy-in and constant lobbying at all levels;
    - Requires recurring involvement of partners and end-customer;
    - Invest in iterative pre-validation exercises to validate “fit-for-purpose” as design evolves.

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# Iterative Design Approach



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# Achieving Certifications

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## What is certification?

- Certification of Aircraft
  - Meet various agency regulations.
- Certification for IT Services
  - When dealing with large infrastructure Contracts, connectivity to private or restricted Networks needs to be certified.

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## Certification Challenges

- Achieve certification on-time for delivery
  - Usually, certification processes take a long time to achieve;
  - A lot of bureaucracy that is compounded by the multi-level contract structure.
- Lessons Learned:
  - Who ever is responsible for achieving certification must have direct contact with the certification agencies;
  - Recurring involvement with certification agencies during design to ensure congruence of solution with established rules and regulations and buy-in in solution.

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# Conclusion & Key Lessons Learned

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## Key Lessons Learned

- The program starts before contract award: make sure that project resources are available and involved during that phase;
- Most problems originate from pre-contract award activities:
  - Prime Contractor should spend the time to clearly define scopes of work prior to contract award;
    - Avoid overlaps and gaps in responsibilities
  - Prime Contractor and partners should spend the time to clearly define inter-dependencies including a list of deliverables;
  - Acceptance process should be defined and agreed to prior to contract award;
  - When contract is process centric, clarify sponsorship and process ownership concepts;
  - Agree on a notional schedule for deliverables and main design gates to ensure alignment of activities;
  - Payment milestones should be strategically defined to support program priorities and key deliverables;
  - Deployment of interim solutions should be clearly defined, scope and schedule approved before contract award.

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## Key Lessons Learned

- Post-contract Award:
  - Delivery team should ensure a good transition from the Business Development team to:
    - Avoid negotiation residues;
    - Ensure objectivity in delivery of the product;
    - Avoid burn out of key resources.
  - Ensure that adequate legal means are place very soon after contract award to properly support government and corporate regulation issues e.g. I.P. protection;
  - Priority should first be placed on integration of system engineering approaches if not yet aligned at contract award;
  - Initiate work on the high-level integration concepts to align design teams and test cooperation channels;
  - If Process Ownership is not there, stop and regroup when it is!

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## New Challenges to come

- Business Continuity Planning (BCP)
- Deployment of Change Management Plan

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