Raytheon

Customer Success Is Our Mission

Thoughts on Program Management

Success Requires Planning

Larry Briggs, Vice-President
Program Management Excellence

17 September 2014

Introduction

Raytheon
Intelligence, Information and Services

- **This is a brief look at Program Management with a compendium of tips for success**
  - Many come from my own experience
  - Others are borrowed from successful Raytheon program / business leaders

Integrity & Performance

Without Them You are Doomed

Raytheon
Intelligence, Information and Services

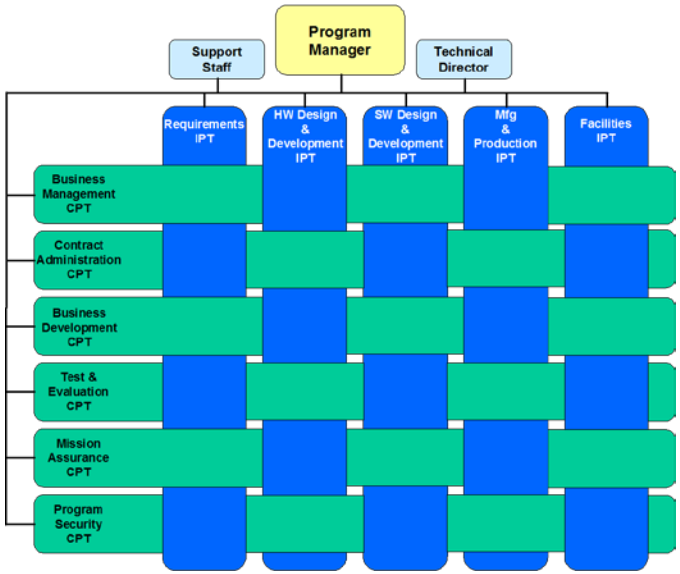
- **Integrity is the backbone of success!**
  - Preserve your integrity and your company's above all else
  - Reputation is everything; without credibility and trust you will always fail
- **Become a quality zealot**
  - Set the example for others to follow
  - Be uncompromising / relentless
  - Assume your salary depends on it (because it probably does)

Organization & Structure

Key Ingredients for Success

Raytheon
Intelligence, Information and Services

- **Organize and structure your program using Integrated Product Teams (IPTs) and Cross Product Teams (CPTs)**
  - Tailor the organization to the WBS structure for clearer definition of responsibilities
- **Place special emphasis on staff selection**
  - Diversity is a key component to success
    - Know your strengths / weaknesses and build a staff to overcome your weaknesses
  - "It's the gift that keeps on giving"



- **Program Manager must lead the team but emphasize joint destiny**
- **Recognize roles and responsibilities; fully utilize the matrix org**
  - Demand they be fully engaged and fulfill the cross program responsibilities for lessons-learned transfer and execution proficiency
  - Hold the Functions (including Functional Management) accountable

Follow Your Company's Process

Be Proactive, Not Reactive

Raytheon
Intelligence, Information and Services

- **Provides the basic tools and guidelines to run a successful program – follow the rules!**
  - Created from lessons learned over many programs
  - Encourages proactive planning
- **Conduct a comprehensive start-up review; it sets the tone for the entire program – get it right and get it done on-time!**
  - Requires all forward-looking issues to be addressed (including acceptance by senior management)
  - Entire team must understand and buy into program requirements, plans and goals – emphasize alignment
    - Executable plan requires ownership by all (govt., Prime, CBTs, business area, etc.)
    - Does the team understand the contractual deliverables and what constitutes "done"?
- **Design Reviews (Requirements, Preliminary Design and Critical Design) plus Readiness Reviews provide independent oversight and buy-in by all the stakeholders**

Execute, Execute, Execute (1 of 4)

Performance Is Almost Everything

Raytheon
Intelligence, Information and Services

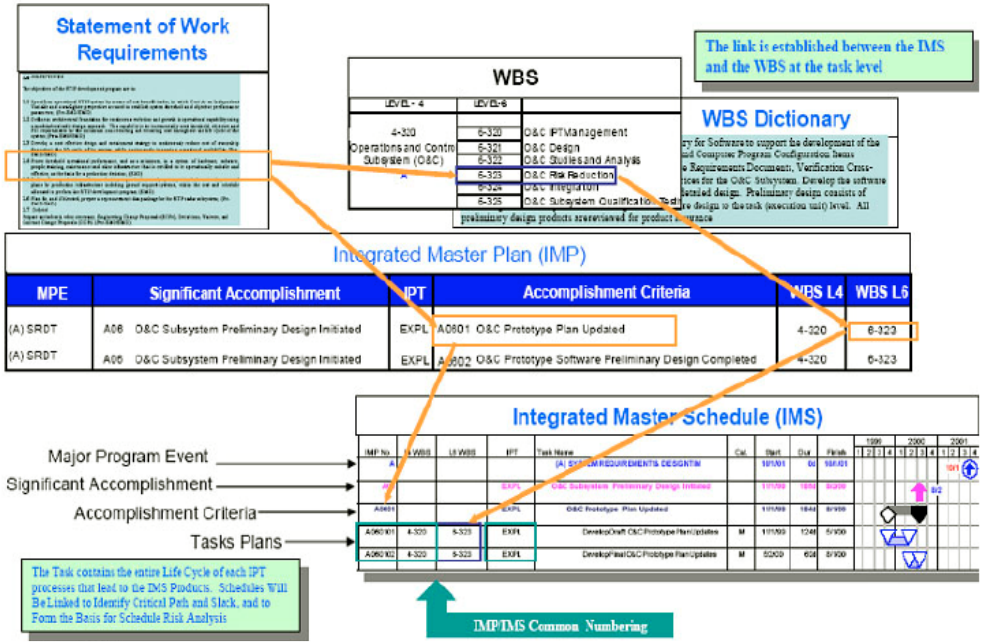
- **On-time, on-budget performance is the expectation (but don't sacrifice integrity or quality). Recognize difference between results and activity**
- **Create an Integrated Master Schedule (IMS) that is all-inclusive**
  - Incorporate both internal and external dependencies (identify predecessors and successors including GFE / CFE, inputs from other programs, etc.)
  - Integrate schedules of major subcontractors
  - Missed milestones need recovery plans
  - IMS is your management plan; much more than just a reporting tool
- **Construct budget baselines around your IPT / WBS structure**
  - Establish work packages that are both definable and measurable
  - Minimize level of effort (LOE) tasks
- **Establish / hold a single management reserve at program start-up**
  - Restrict authorization for use to you (or better, to your boss)
  - Report to senior management any use of management reserve

Execute, Execute, Execute (2 of 4)

Performance Is Almost Everything

Raytheon
Intelligence, Information and Services

- **Ensure your Cost, Schedule and Technical are truly integrated**
  - Use the Start-Up Review for team alignment and commitment
  - Conduct an Integrated Baseline Review (IBR) with customer early in program and obtain concurrence



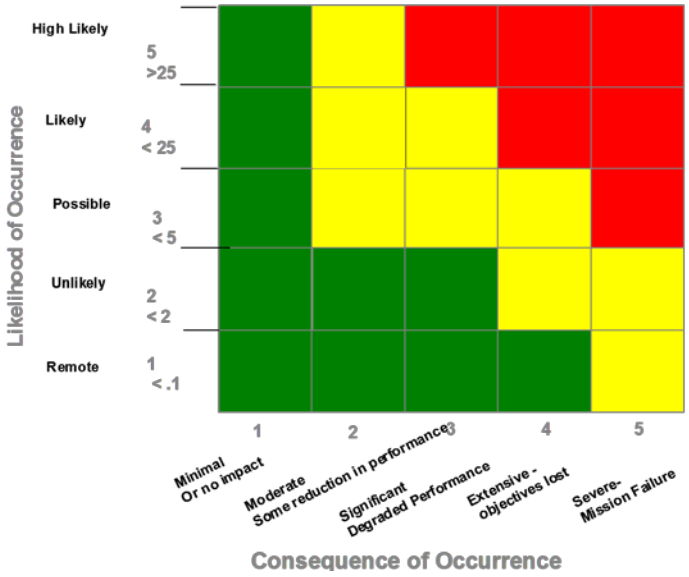
- **Use EVMS as a leading indicator, not a lagging indicator**
  - Using EVMS only as a tracking tool (lagging indicator) means you are a reporter, not a manager / leader

Execute, Execute, Execute (3 of 4)

Performance Is Almost Everything

Raytheon
Intelligence, Information and Services

- **Manage (don't monitor) significant program risks and establish mitigation plans**
  - Schedule monthly risk review meetings to review existing risks, identify new risks / opportunities and scour risk mitigation plans / capture harvest plans
  - Each risk / opportunity should have an owner
  - Does everyone know the Top 5 Program Risks?
  - Risks and opportunities must be quantified



- **Hold each direct report formally accountable for their portion of program profit and loss**
  - Be quantitative (e.g., SPI > 1.05, CPI > 1.05, Award Fee > 95%, etc.)
- **Communicate, communicate, communicate**
  - Team can't help you if they don't know the problem
- **Break down the stovepipes – seek common solutions**

Execute, Execute, Execute (4 of 4)

Performance Is Almost Everything

Raytheon
Intelligence, Information and Services

- **Don't "shoot the messenger" and insist on timely reporting (<24 hours) of all issues (you must know before your customer does)**
  - Share important issues with your boss (your customer should never be able to surprise him / her)
  - Bad news does not get better with time; don't be afraid to ask for help
- **Promises made = Promises kept**
- **Keep and use an action item log**
  - Recommend starting re-occurring meetings with actions from past meetings
- **Program Managers must balance Technical, Cost and Schedule**
  - As a general rule, IPT leaders should be the CAMs
- **No excuses for late deliverables**
- **Do it right the first time; Rework = Waste**

Reviews & Reporting (1 of 4)

Information Trumps Misunderstanding

Raytheon
Intelligence, Information and Services

- **Hold crisp weekly IPT meetings (keeps you and everyone else informed)**
  - Minimizes surprises and facilitates timely decisions
  - Forces accountability and fosters team concept
  - Should not be a monologue – seek concise dialog
  - Review EVMS ACs (delinquent, current, 30 / 60 days ahead)
  - Review deliverables (including CDRLs) delinquent, current, 30 / 60 / 90 days ahead
  - Share a common program calendar
  - Manage by exception if you can (conserves time to focus on issues)
- **Religiously hold monthly program reviews**
  - Each Control Account Manager (CAM) presents his / her status and outlooks
    - Does the story pass the "gut check" and do the performance metrics support it?

"In God we trust; All others must bring data"

W. Edwards Deming

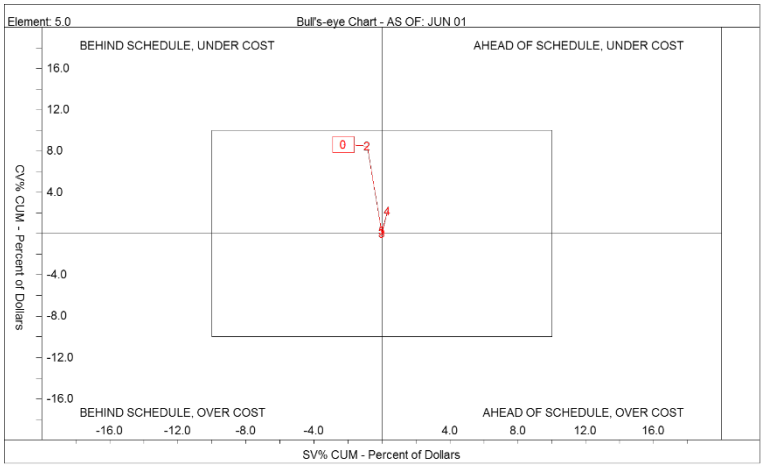
Reviews & Reporting (2 of 4)

Information Trumps Misunderstanding

Raytheon
Intelligence, Information and Services

- **Summarize program status in a weekly highlights report**
  - Forces you to think about overall program and clarifies progress / issues
  - Always report Accomplishments vs. the established Baseline Plan
  - Identify issues (especially if Cost and Schedule are jeopardized)
- **Maintain and report on key program progress and process metrics**
  - Make data-based decisions

CV / SV Bulls-Eye



Software Defect Containment

Phase Originated / Phase Detected	Requirements	Design	Code & Unit Test	Integration	S/W Qual Test	System Integration	S/W Maintenance	Total Defects in Phase	Percentage of Total Defects Detected
Requirements	95							95	3%
Design	37	121						158	6%
Code & Unit Test	54	37	1370					1461	51%
Integration	99	39	599	37				774	27%
S/W Qual Test	50	4	115	2	11			182	6%
System Integration	47	7	79	3	0	16		152	5%
S/W Maintenance	12	2	13	1	0	0	0	28	1%
Total Defects Originated in Phase	394	210	2176	43	11	16	0	2850	
Percentage of Total Defects Originated	14%	7%	76%	2%	0%	1%	0%		
Percentage Detected and Originated in Same Phase	24%	58%	63%	86%	100%	100%	N/A		

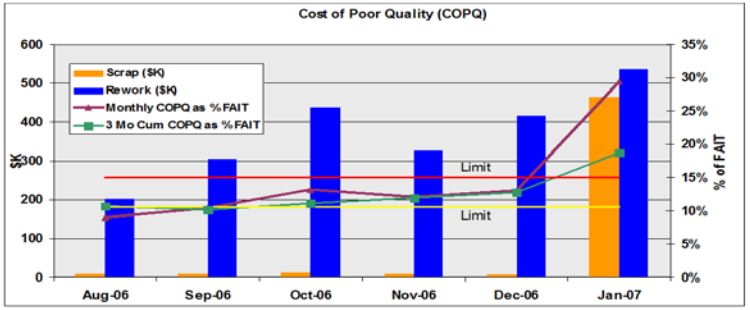
Reviews & Reporting (3 of 4)

Information Trumps Misunderstanding

Raytheon
Intelligence, Information and Services

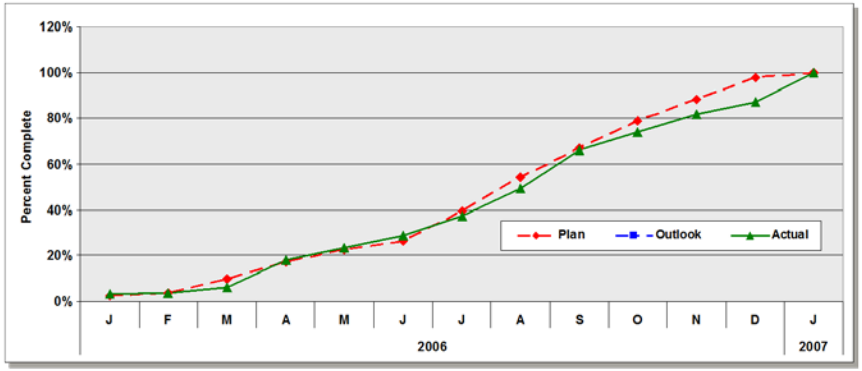
- **More Metric Examples:**

Cost of Poor Quality



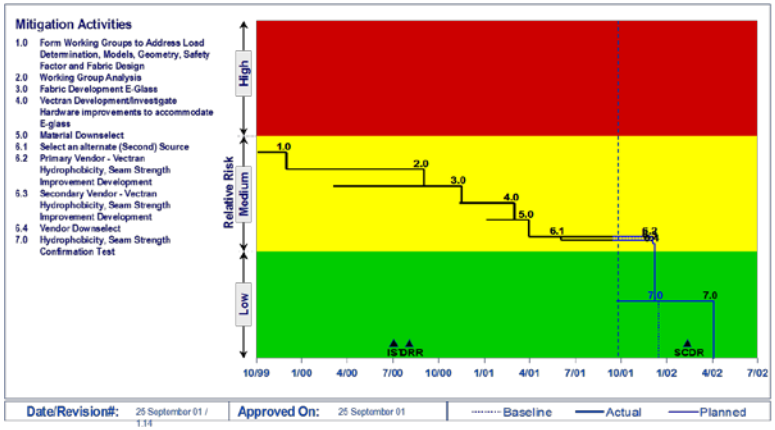
Updated Monthly Last Update: 1 Feb 07	Previous 6 Months	Current 6 Months	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	Jan-07
Scrap ($K)	52.0	512.2	8.9	9.9	11.7	9.5	7.9	464.4
Rework ($K)	661.2	2225.7	203.2	304.8	439.2	326.5	416.3	535.7
FAIT ($K)	8,212.6	18210.6	2,359.2	3,029.4	3,412.0	2,786.0	3,232.8	3,391.2
Scrap as % FAIT	0.63%	2.81%	0.38%	0.38%	0.34%	0.34%	0.24%	13.69%
Rework as % FAIT	8.05%	12.22%	8.6%	10.1%	12.87%	11.72%	12.88%	15.80%
Total COPQ	713.2	2,737.9	212.1	314.7	450.9	336.0	424.2	1,000.1
Monthly COPQ as % FAIT	8.7%	15.0%	9.0%	10.4%	13.2%	12.1%	13.1%	29.5%
3 Mo Cum COPQ as % FAIT			10.7%	10.2%	11.1%	11.9%	12.8%	18.7%
6 Mo Cum COPQ as % FAIT	N/A	N/A	9.8%	10.3%	11.3%	12.5%	13.6%	15.0%

Software Integration Progress

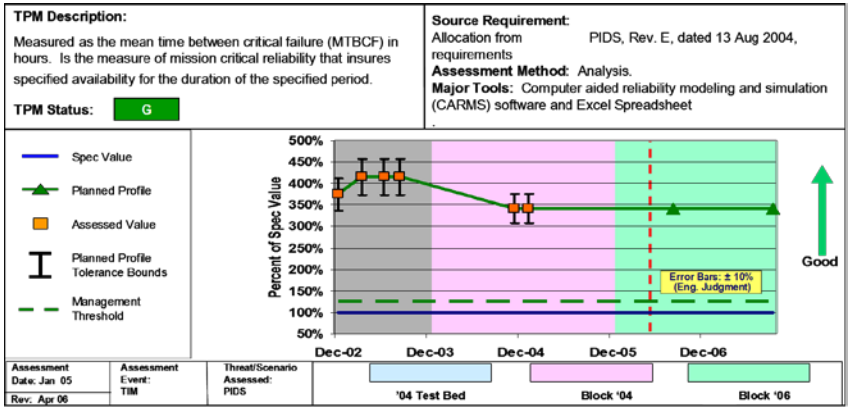


	2006 J	F	M	A	M	J	J	A	S	O	N	D	2007 J
Plan	2.5%	3.8%	9.8%	17.4%	22.4%	26.4%	39.5%	54.2%	66.9%	78.7%	88.2%	97.7%	100%
Outlook													
Actual	3.1%	3.6%	6.3%	17.9%	23.5%	28.9%	37.5%	49.5%	66.3%	73.8%	81.8%	87.1%	100%
Completion Index	124%	95%	64%	103%	105%	109%	95%	91%	99%	94%	93%	89%	100%

Risk Mitigation



Technical Performance Measure

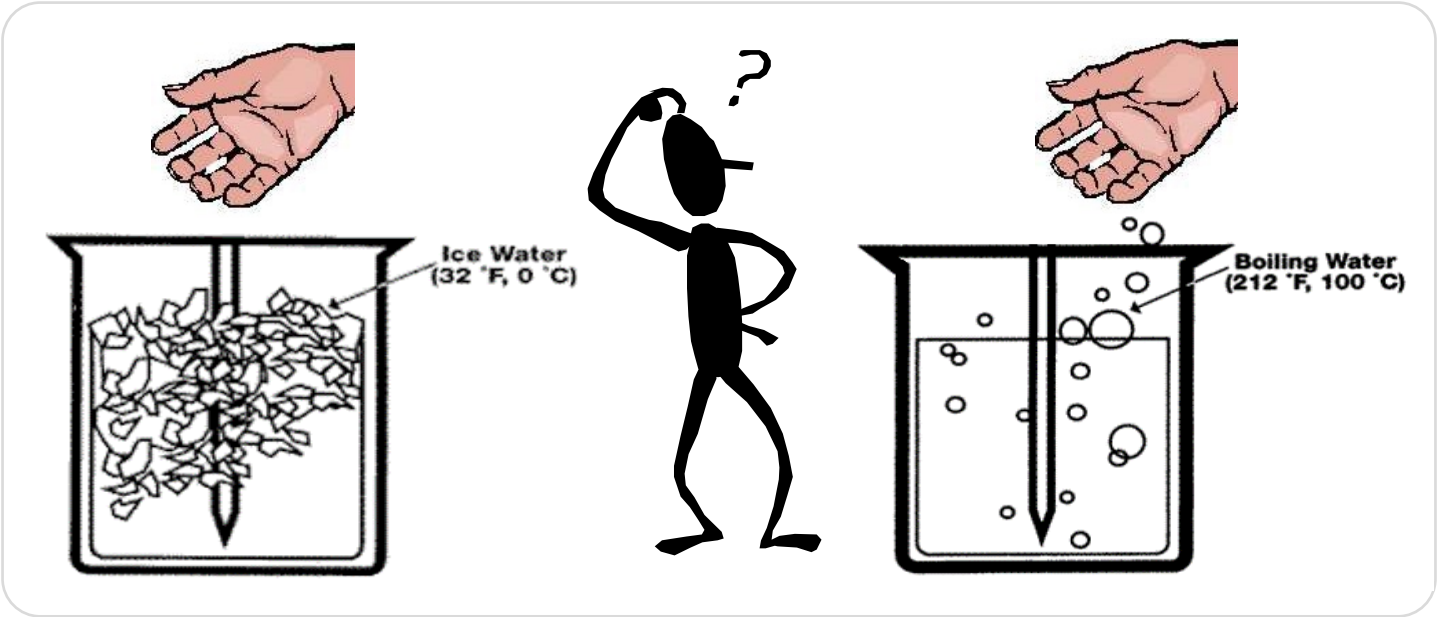


Reviews & Reporting (4 of 4)

Information Trumps Misunderstanding

Raytheon
Intelligence, Information and Services

- **Don't get lulled into a false sense of security by reviewing / reporting EVMS SPI / CPI at the Total Program Level**
  - **Laws of Large Numbers** will mask real problems that will grow to get you
  - Understand detailed cost / schedule variances



One hand in ice water and one hand in boiling water doesn't equate to room temperature

Lessons Learned = Invaluable (1 of 2)

- **In-depth, independent design reviews during the development phase are critical**
  - Hold reviewers (and their managers) accountable
- **Deal only with reputable suppliers who have previously demonstrated capability and commitment**
  - Solid engineering and strict adherence to process are vital
  - Mandate frequent surveillance by Engineering and Mission Assurance / Quality
- **For large volume production, institute sample qualification throughout the build cycle (not just initial qual) to detect subtle changes and ensure delivery of spec-compliant hardware / software**
- **Robust configuration management system is mandatory**
- **Treat RF components, power supplies, magnetics and connectors as critical items (not as commodities)**
  - History shows these to be most common causes of failures in the field
  - Low bidder shouldn't necessarily win (quality trumps low price every time)
  - Conduct rigorous qual program and frequent, periodic in-process inspections

Lessons Learned = Invaluable (2 of 2)

- **Insist on total access at all vendors**
  - Understand every technical process
    - Don't permit screen of "…Proprietary Information" to block insight
  - Process control is key to predictability and quality
  - Have seat on vendor CCB, or as minimum, get advanced copies of pending vendor change notices throughout your production run
    - Often the supplier does not know the intended use and therefore can't ensure their change will be no impact to your product
- **Inspect, don't expect**
  - Require solid evidence of compliance
- **Get the engineering right! It's all too common that in the early stages of the program things go well only to have the "wheels fall off" later in test**
- **Include Manufacturing / Mission Assurance / Performance Excellence personnel early in the design process. Have them sign off on the Engineering Design Package**

Customer Involvement

Create a Team Environment

Raytheon
Intelligence, Information and Services

- **Don't view your customer as an adversary – they're your partner**
  - Program success is the common goal – failure helps neither party
- **Make the customer feel that he / she is an integral part of your team**
- **Invite customer to all key reviews**
  - Demonstrates a willingness to be open and to share information
  - Conversely, it shows you are not trying to hide "bad news"
- **Allow on-site customer representatives**
  - Co-location contributes to the "team" environment
- **Provide photographs of manufacturing / construction / testing progress, on a frequent basis, to provide evidence of accomplishments and foster ownership**

In Conclusion...

Raytheon
Intelligence, Information and Services

- **Integrity is paramount – never compromise for short-term gain**
- **Maintain focus on your customer's expectations, needs and goals**
- **Create an executable program plan and deliver as promised**
- **Remember – You can't do it all by yourself**
  - Surround yourself with talented, "can do" people
  - Recognize accomplishments and reward excellent behavior
  - Hold people accountable
- **Program Management is similar to a computer operating system**
  - You assign resources
  - You set the priorities
  - You handle the interrupts
  - You network for information
  - You sequence operations
  - **If you don't do it well, you crash!**

Questions

Raytheon
Intelligence, Information and Services