



- Carnival is a holiday/leisure company, not a shipping company.
- Of course the cruise ship as a technical platform is an integral part of the product.
- Integrated alarm, monitoring and control systems are essential for a modern cruise vessel to ensure safe and efficient operation and at the same time controlling manning requirements and hence costs.

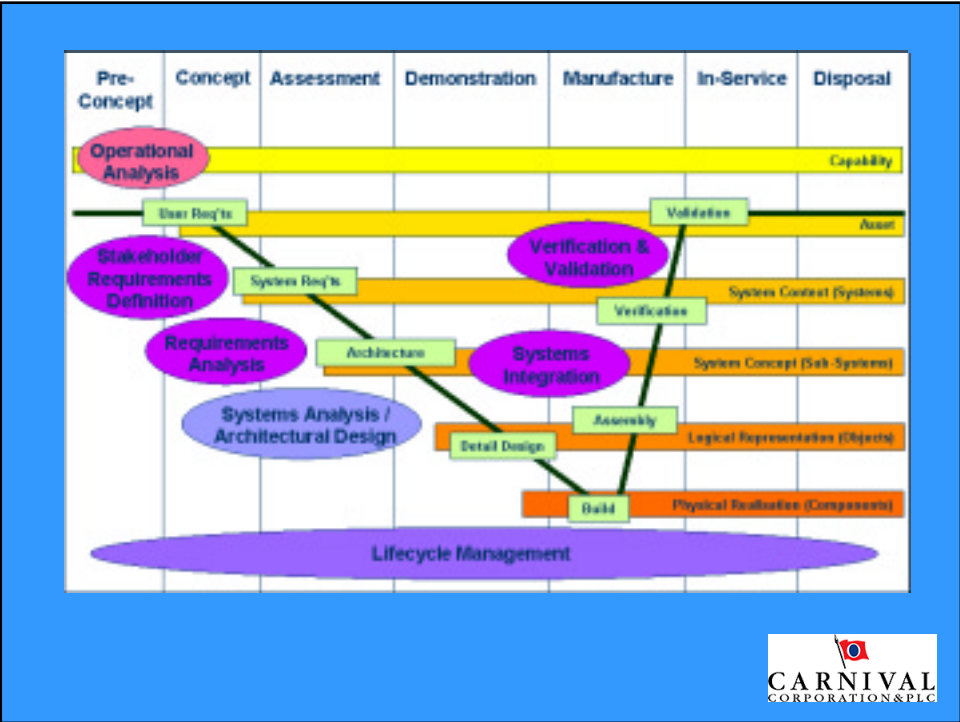
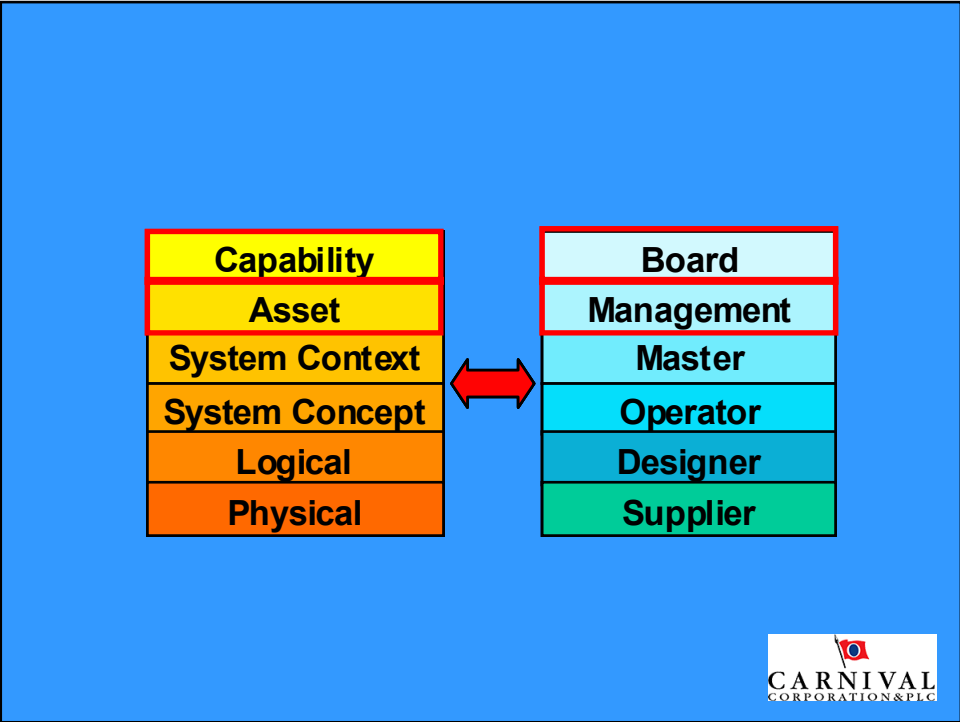


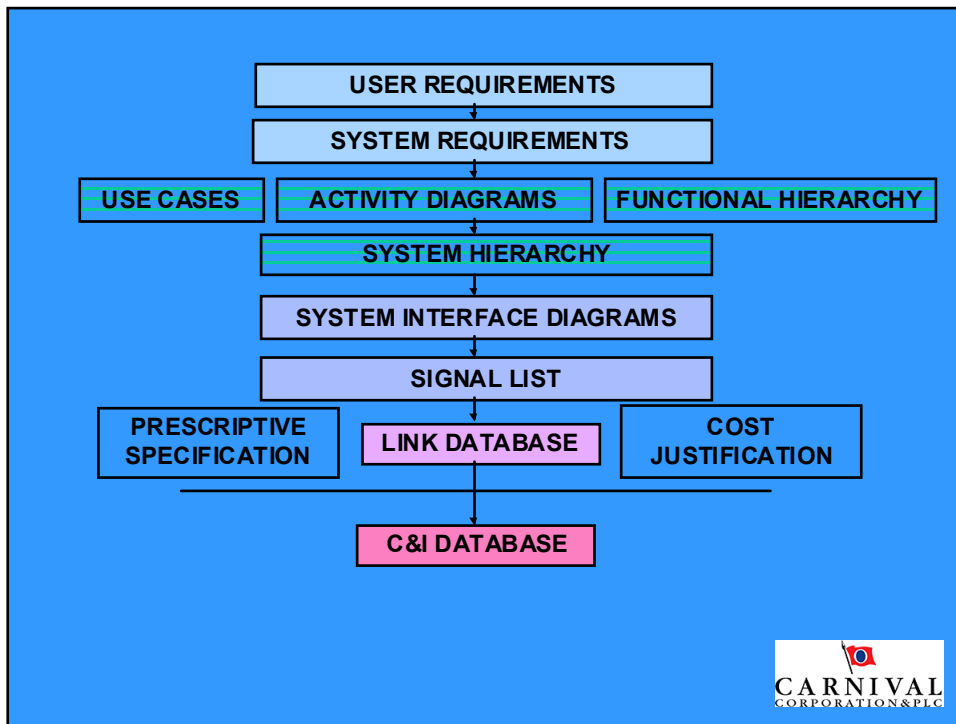
- Current difficulties include systems based on an ad hoc compilation of requirements with little emphasis on defining the actual capabilities required.
- Result is a lot of information, a lot of alarms, lack of involvement in managing the ship and lack of usability, leading to operator disillusionment and dissatisfaction and sometimes, and more seriously, potentially dangerous errors.
- Less interested in hardware (should be able to take integrity for granted from reliable suppliers!) than functionality.
- In summary, we are not sure system is “good value for money”!!



- Working with BMT DSL, Carnival is defining its requirements in a structured way to ensure there is an audit trail of need from physical component level, up through functional requirements, to overall capability owner needs.







STEP	OBJECTIVE	TECHNIQUE
1	Avoid problem at source.	Good plant design.
2	Automatic clearance of alarm	Automation / Predictive algorithms / inhibits
3	Delay onset of alarm	Redundancy / Local protection
4	Prioritise alarms	Multiple layers
5	Combine alarms	Rationalise alarm logic
6	Filter	IKBS / AI
7	Minimise distraction	Efficient annunciation
8	Allocate to dedicated operators	Distinguish between watchkeeper / maintainer etc
9	Enable efficient response	Advanced displays!

LEVEL	TITLE	RESPONSE
1	A1	EMERGENCY
2	A2	IMMEDIATE
3	A3	PRIORITY
4	A4	URGENT
5	A5	INVESTIGATE
6	A6	LOW PRIORITY
7	A7	NON-OPERATIONAL
8	EVENT	INFORMATION ONLY



- Process has to be “bottom up” as well as “top down” as operators, for example, will feed in information at all levels from the physical up to system context.
- Process well under way and looking promising.
- Will also identify system boundaries/interfaces.
- Ability to conduct cost versus capability trading, an important requirement for the future.





Thank you

