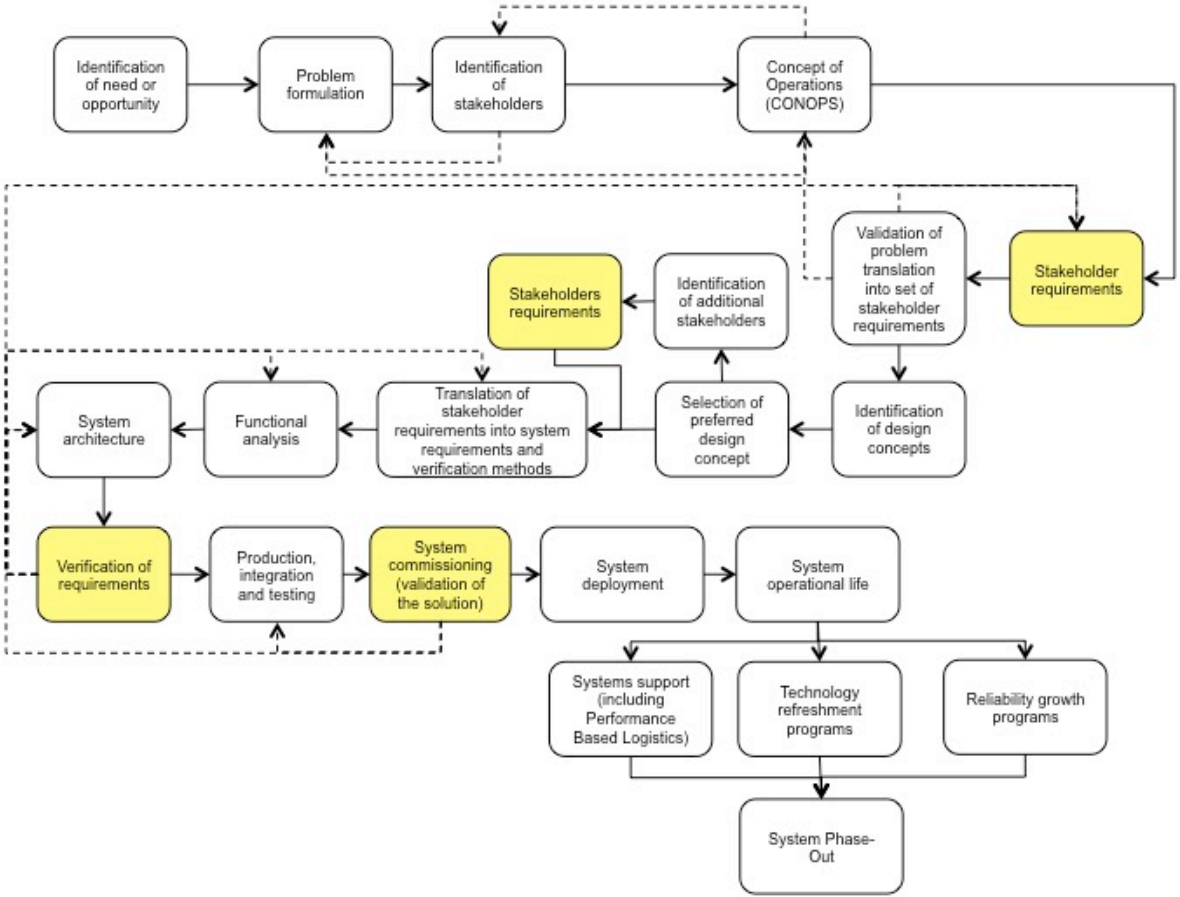
26th annual INCOSE international symposium
Edinburgh, UK
July 18 - 21, 2016

Engineering logistics support requirements for new members in a federation of systems

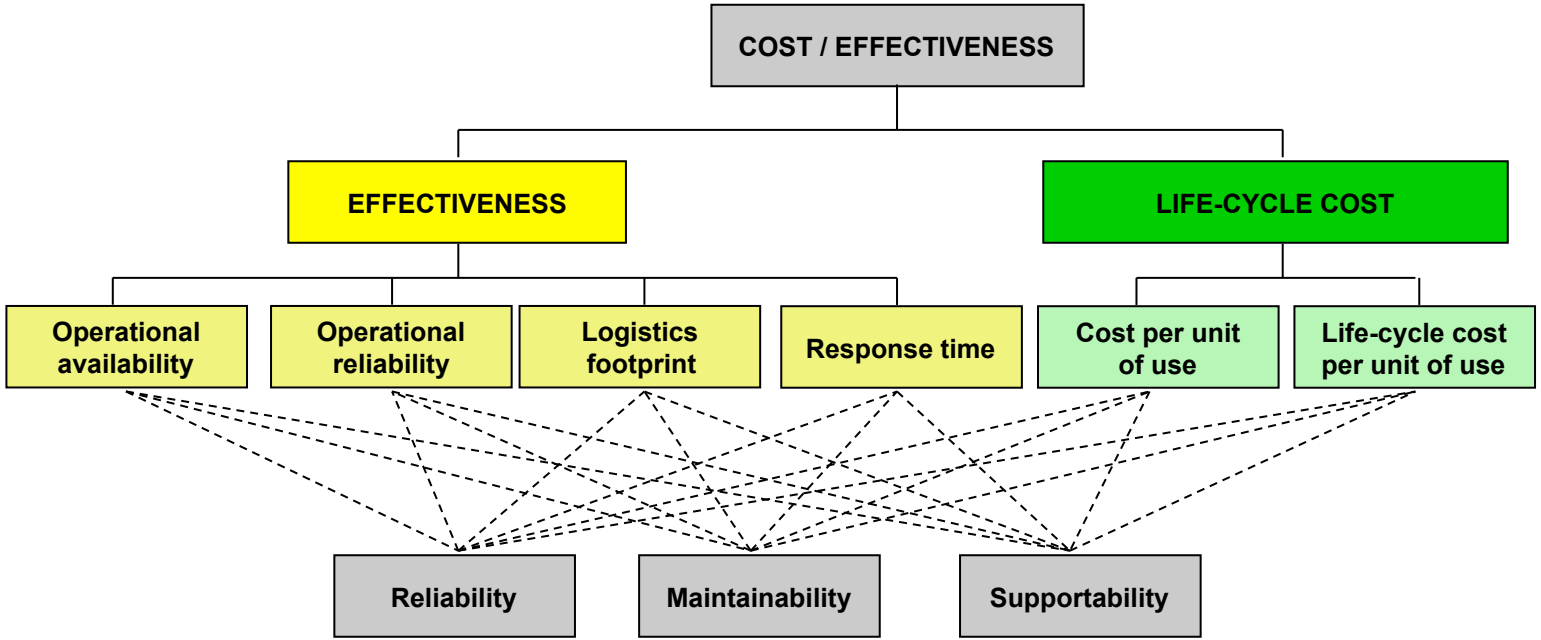
Alberto Sols, PhD
Norwegian Institute of Systems Engineering
University College of South-East Norway

The systems engineering framework



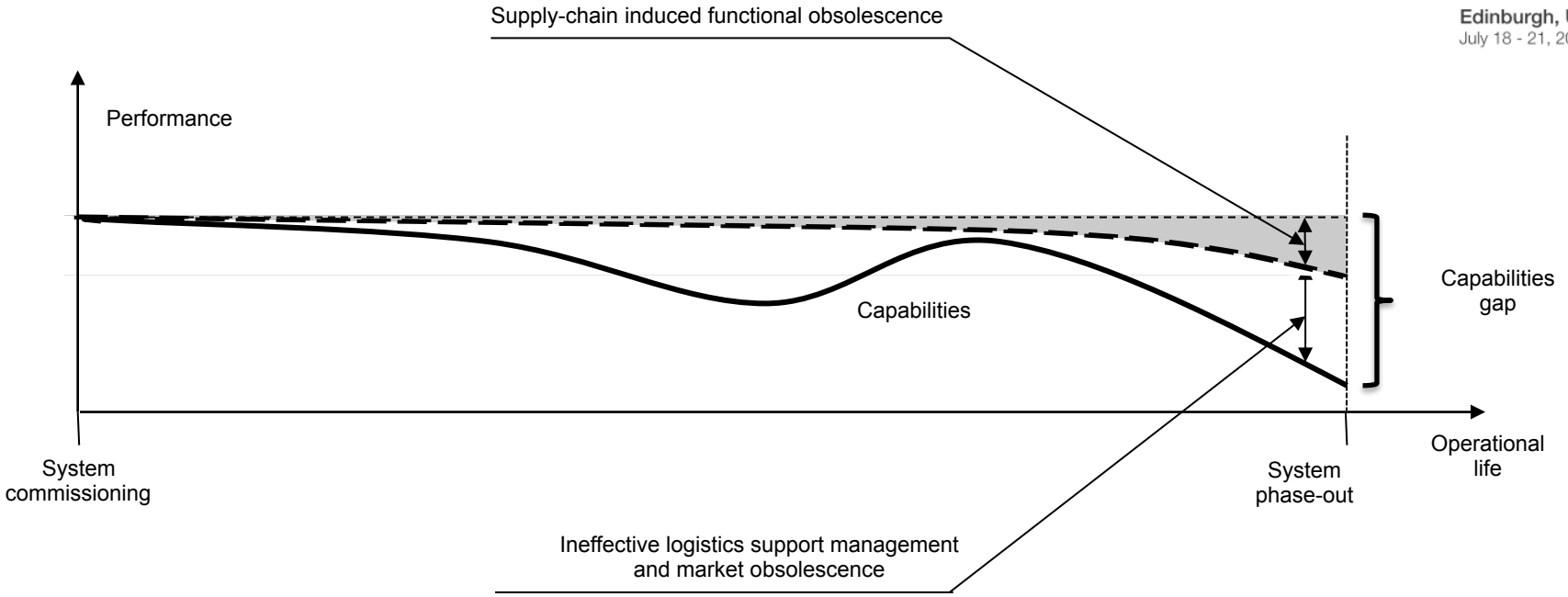
Cost/effectiveness ratio

26th annual INCOSE international symposium
Edinburgh, UK
July 18 - 21, 2016

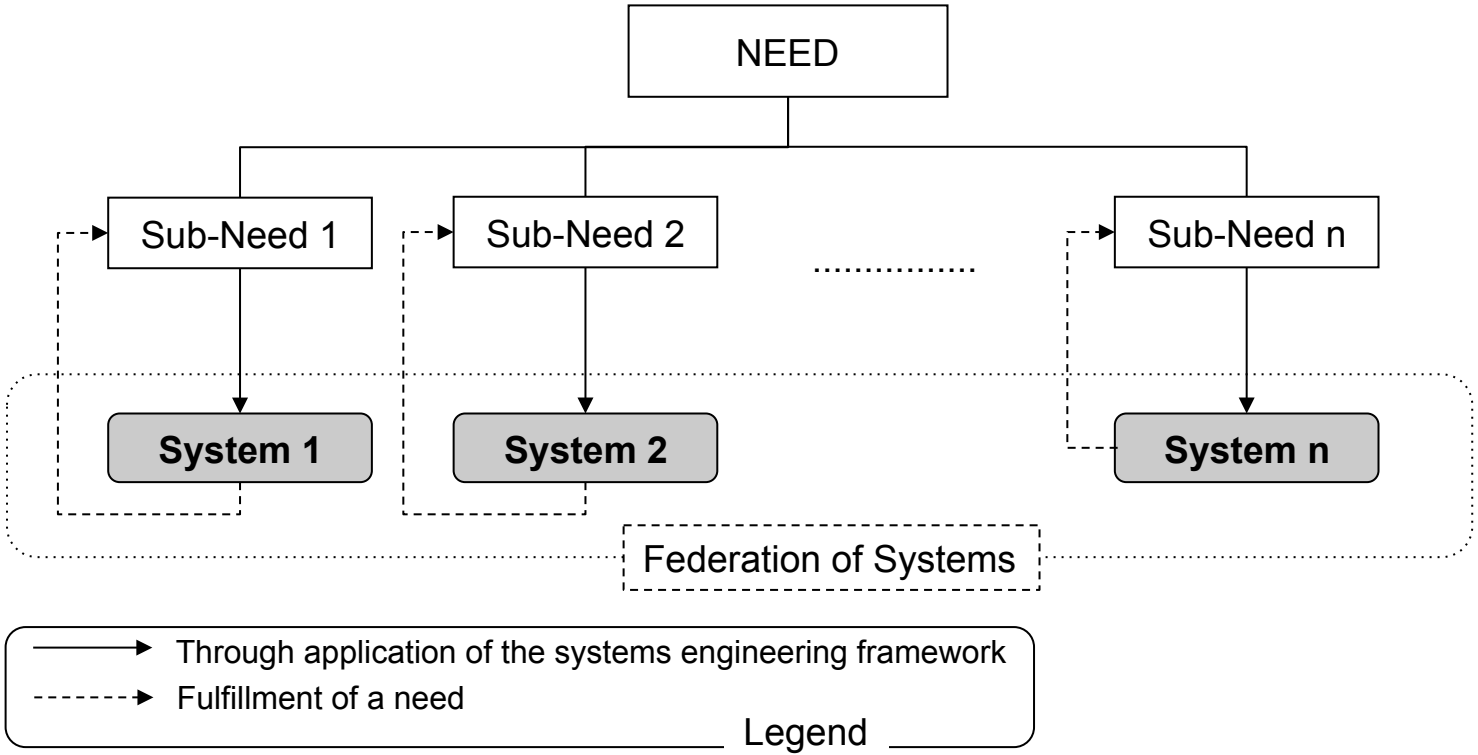


The capabilities gap

26th annual INCOSE international symposium
Edinburgh, UK
July 18 - 21, 2016



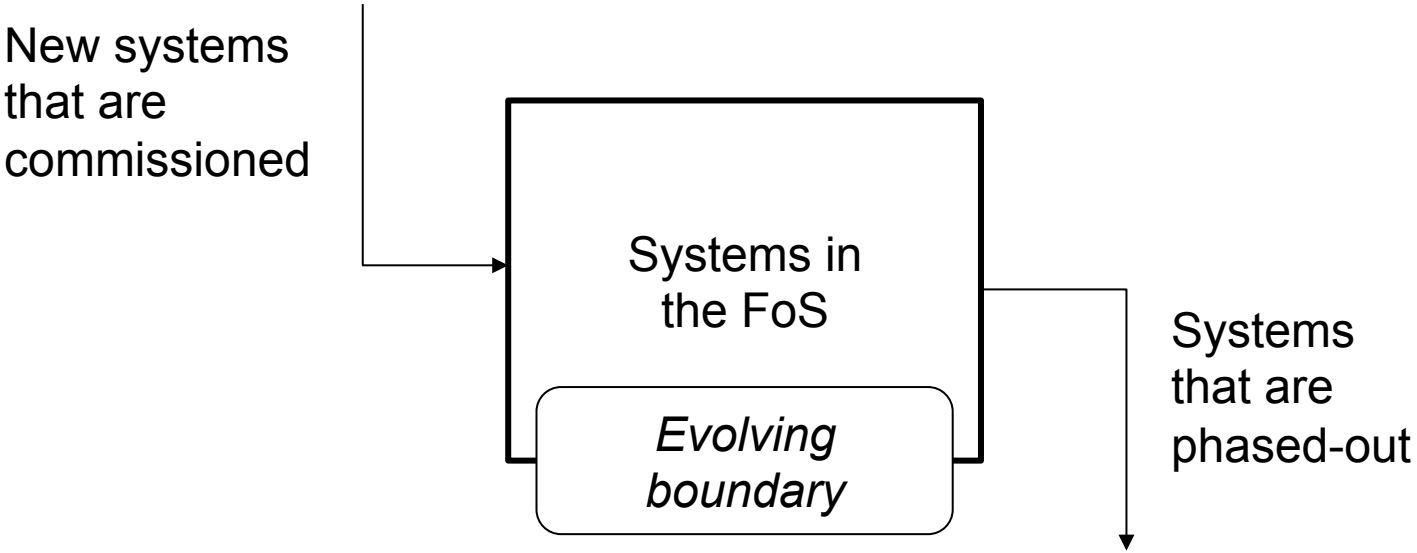
Federations of systems



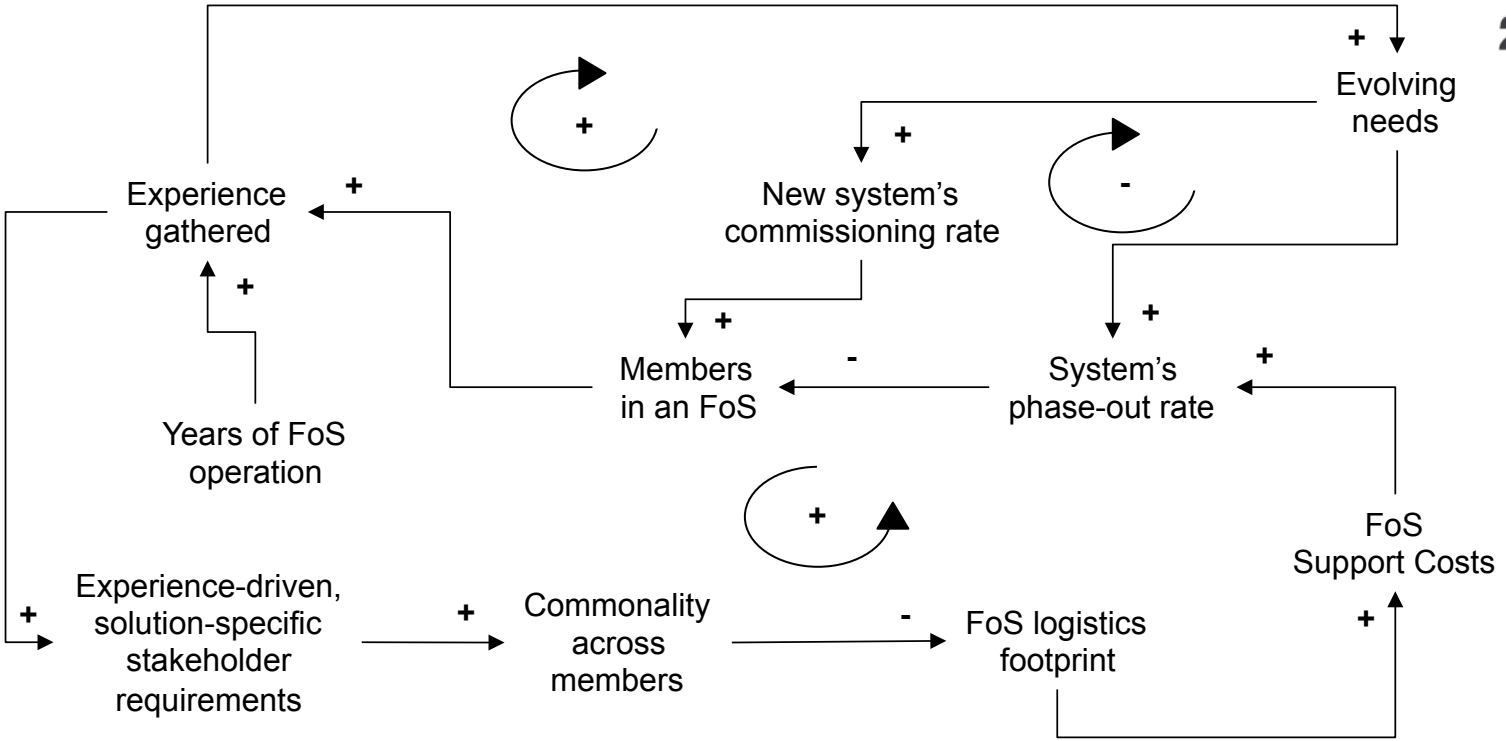
A family of trains

A family of missiles

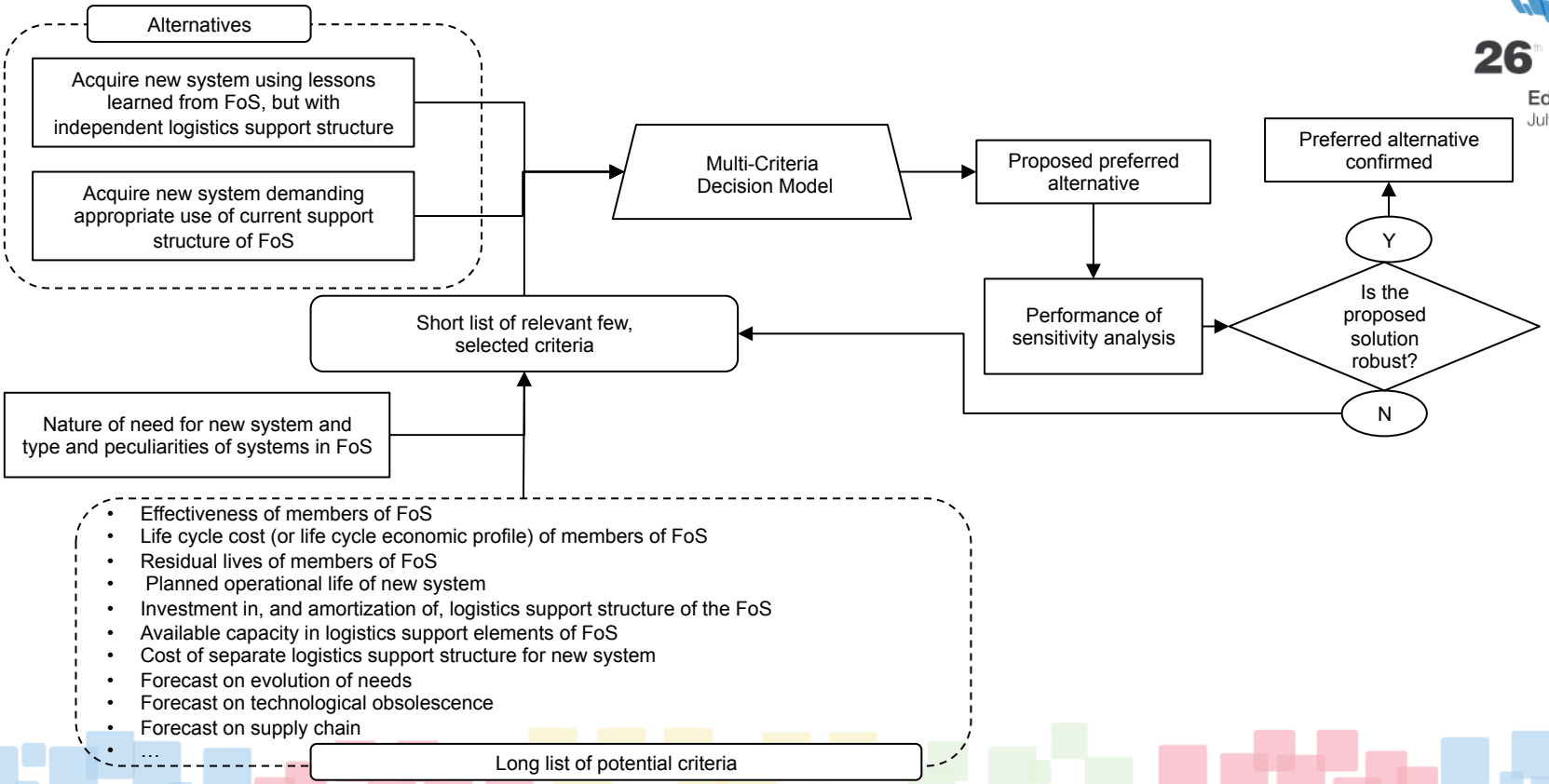
Dynamic families of systems



Dynamic behavior of an FoS



Decision-making process



Two scenarios

26th annual INCOSE international symposium
Edinburgh, UK
July 18 - 21, 2016

Two possible scenarios when engineering the requirements for a new system that is to join an existing FoS:

1. It is desired to use certain logistics support elements of the FoS and it is articulated in the logistics support related requirements.

2. The logistics support elements of the new system are initially considered without any restrictions, and if any reasonable overlaps with existing resources are detected, their adoption is fostered to the extent possible.

Engineering logistics support requirements (1/4)

- Maintenance and test & support equipment.

- ✓ SAMe was developed by INDRA in mid 90s under a request from the Spanish MoD.
- ✓ Requested for maintenance and troubleshooting of electronic equipment in new defense systems.
- ✓ Huge savings in new investments, reduction in logistics footprint and in operational costs.

Engineering logistics support requirements (2/4)

- Personnel and training.

✓ For the F-100 frigate the Spanish Navy requested that the preventive maintenance tasks to be carried on board were compatible with the number, skills and qualifications of their personnel.

Engineering logistics support requirements (3/4)

26th annual INCOSE international symposium
Edinburgh, UK
July 18 - 21, 2016

- Facilities

✓ When RENFE decided to change the tilting system of the S594 trains, it requested that the maintenance facilities used for the S598 tilting trains could be used.

✓ It meant huge savings in investments in equipment and in training.

✓ It leveraged better use of existing facilities and of available personnel.

Engineering logistics support requirements (1/4)

- Spares and consumables

✓ Spanish MoD has requested since mid 80s that all new systems have their spare parts catalogued with NATO Stock Number.

✓ This has allowed for consolidation of spares and consumables.

✓ Commonality has been required across members of families, such as in PIZARRO (IFV, Command Post, Forward Observer, …).

✓ The reduction in logistics footprint and the savings in costs have been significant.

Conclusions

Engineering stakeholder requirements that require, for new systems, appropriate use of logistics support resources of an FoS enables:

1. capitalizing on the lessons learned with the use of fielded systems.
2. a reduction in the logistics support costs.
3. a reduction in the response time.
4. a reduction in the logistics support footprint.
5. an increase in the operational availability of the system.


Thank you!