AUTONOMIC LOGISTICS

An Infrastructure Approach:

Ray Hingst

Greg Gunter

Faculty of Business

University of Southern Queensland

AUTONOMIC LOGISTICS

Ray Hingst – M.AL (Hons), Grad.Dip.Ed, B.Admin CMILT, CAHRI

Lecturer – Faculty of Business

Current posting (Reserve) - Project Officer, Regimental Headquarters 7th Signal Regiment [Army]

Logistics Officer (RACT) - Major

Chief of the Defence Force Unit Commendation (2006)

Greg Gunter – BBA, MPA

25 yrs. U.S. DoD- DCMC (DLA); AFCMD (AFLC)

Majority (15 yrs.) at Pratt & Whitney Florida; Price/Cost Analyst, Estimating System Specialist, Administrative Contracting Officer

Programs – Joint Advanced Strike Tech./Joint Advanced Strike Fighter; F100-PW-100 thru 229 (F-15, F-16); F117-PW-100 (C-17), TF-30 (F-111,F-14); J52 (A-4)

Space Shuttle Main Engine Alternate Turbo Pump Development; RL-10 Rocket Engine

USQ
PER STUDIA MENS NOVA
AUSTRALIA

Scope

- Autonomic Logistics (AL) defined
- Assumptions – cost of (Australian) program
- PHM Vs Infrastructure
- Australian resource drivers
- AL skills base
- Skills threats
- Challenges for Australian Consortium
- Human capital and intellectual capability

Definition

Autonomic – functioning involuntarily

Logistics – art of moving, lodging and supplying troops and equipment

Autonomic Logistics (AL) suggests logistics happening automatically.

In JSF this might apply if only one aircraft is being supported but as soon as two or more are involved, trade-off and consolidation (tactical) decisions need to be made.

Data such as in-flight prognostics and inventory levels may be automatically fed into the Autonomic Logistics Information System (ALIS) to determine what maintenance and/or repairs are needed. However, determining when, where, and even if, these occur will be made based on required operational availability.

AL is an infrastructure that is based on a feedback matrix with prognostics and status automatically fed in.

AJSF AL COSTINGS

-Per unit cost of an aircraft (A/C) – US$50 Million

-Australian program uses a 100 aircraft buy equating to US$ 5 Billion

-Support costs generally represent approximately 67% of a program and aircraft costs equal 33%.

-Based on the above, the support costs would be US$10 Billion.

-Lockheed estimates a 20 % savings on the normal support costs due to AL.

The unique INFRASTRUCTURE of the JSF program (including automated PHM and status systems) results in the US$ 2 Billion savings to the Australian JSF.

PHM front end of AL

The accuracy and amount of Prognostics and Health Monitoring (PHM) data is very important. However, PHM has been around for decades. The F100 engine (Pratt & Whitney) program utilised the Electronic Engine Control (EEC) then the Digital Electronic Engine Control (DEEC) followed by the Improved DEEC (IDEEC) and finally the Full Authority Digital Engine Control (FADEC). Diagnostic units were the Engine Diagnostics Unit (EDU) and the Ground Diagnostics Unit (GDU).

What is different is the autonomic linkage between the aircraft and the base/factory and back.

The old concept of:

FACTORY to FOXHOLE

Is redefined as:

FOXHOLE to FACTORY to FOXHOLE

ALIS as a metacognitive system

- Metacognition
  - Three levels of 'knowledge'
    - 1st level – knowing something
      - Data from PHM
    - 2nd level – knowing that you know something
      - That a component is approaching the end of its service life and will require replacement
    - 3rd level – knowing that you know that you know something
      - That replacement component/s is/are required; designation of place, date and time for maintenance/repair; check availability of technician, equipment and consumables. This includes Local Operational Analysis Decisions (LOADs) where the Logistician determines supplementary actions due to unscheduled repairs (battle damage, bird strikes, etc.)
- Provides basis for Logistician/Warfighter communication/negotiation re OP tempo/airframe availability etc.

USQ
AUSTRALIA

ALIS as a predictive system

- 4Ds of Sustainment logistics
  - Demand
    - What elements are required to perform a service event
  - Destination
    - Where the service event will take place, (base)
  - Distance
    - From OEM component supply, technician, equipment
  - Duration
    - Time required to bring component elements to base for duration of the service event

AUSTRALIAN JSF RESOURCE DRIVERS

- Normal Support for AJSF
  - Bases
  - Manufacturers
  - Transport/Warehousing

-Production, Sustainment & Follow-on Development (PSFD) MoU ensures AJSF can utilise program data

-Future Business Potential

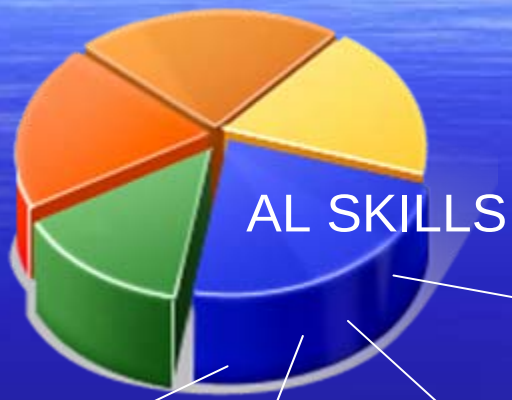
Any credible option requires an Australian capability

-Australia - Regional JSF Centre

SKILLS BASE

- Logisticians
  - Defence
  - Transport
  - Manufacturing
- Technical
  - Software Development
  - Hardware Specialists
    - PHM
    - Transport (RFIDS, etc.)

SKILLS COMPETITION



Human capital & intellectual capability

- Lead time (commencing 2008)
  - Academic development/approval of AL
  - Graduates (2010/11)
- Intense competition for AL human capital
- Lead time short to prepare AL capability for JSF
- Industry OJT and Internship necessary
- Skill Base essential for PSFD success

AUSTRALIAN CONSORTIUM

-OJT

-Internships

-Academic Programs

- Skilling Australian Defence Industry (SADI)

Conclusion

- AL is:
  - Estimated to produce AJSF program savings = US$2 Billion
  - Based on a matrix using prognostics and auto status feeds
  - a metacognitive Information System
  - a foxhole to factory to foxhole logistic concept
- Emerging intense competition AL skills base
- Australian capability must be developed now

AJSF and Government/Industrial/Academic development support required to ensure skills base for PSFD

USQ AUSTRALIA