



Fleet Maintenance Facilities

Strategic Capability and

AJISS ISSC

13 September 2016





PSPC Introduction

- Turn off cell phones
- No pictures of the facility
- Address any questions to:

NPEANSISES.AOPSJSSISS@tpsgc-pwgsc.gc.ca

- This presentation will provided on buyandsell.gc.ca
- Only Information issued on buyandsell.gc.ca will be applicable to this RFP
- Tour groups as per the sign in sheet
- Note Appendix J to PWS – Fleet Maintenance Facility Strategic Capability Statement





Agenda

- Aim of the visit
- In-service Support Model
- FMF Strategic Capabilities
- Tour of FMF Cape Breton





Aim

Provide an overview of FMF Strategic capabilities as it relates to the execution of 2nd line AOPS/JSS dockyard maintenance





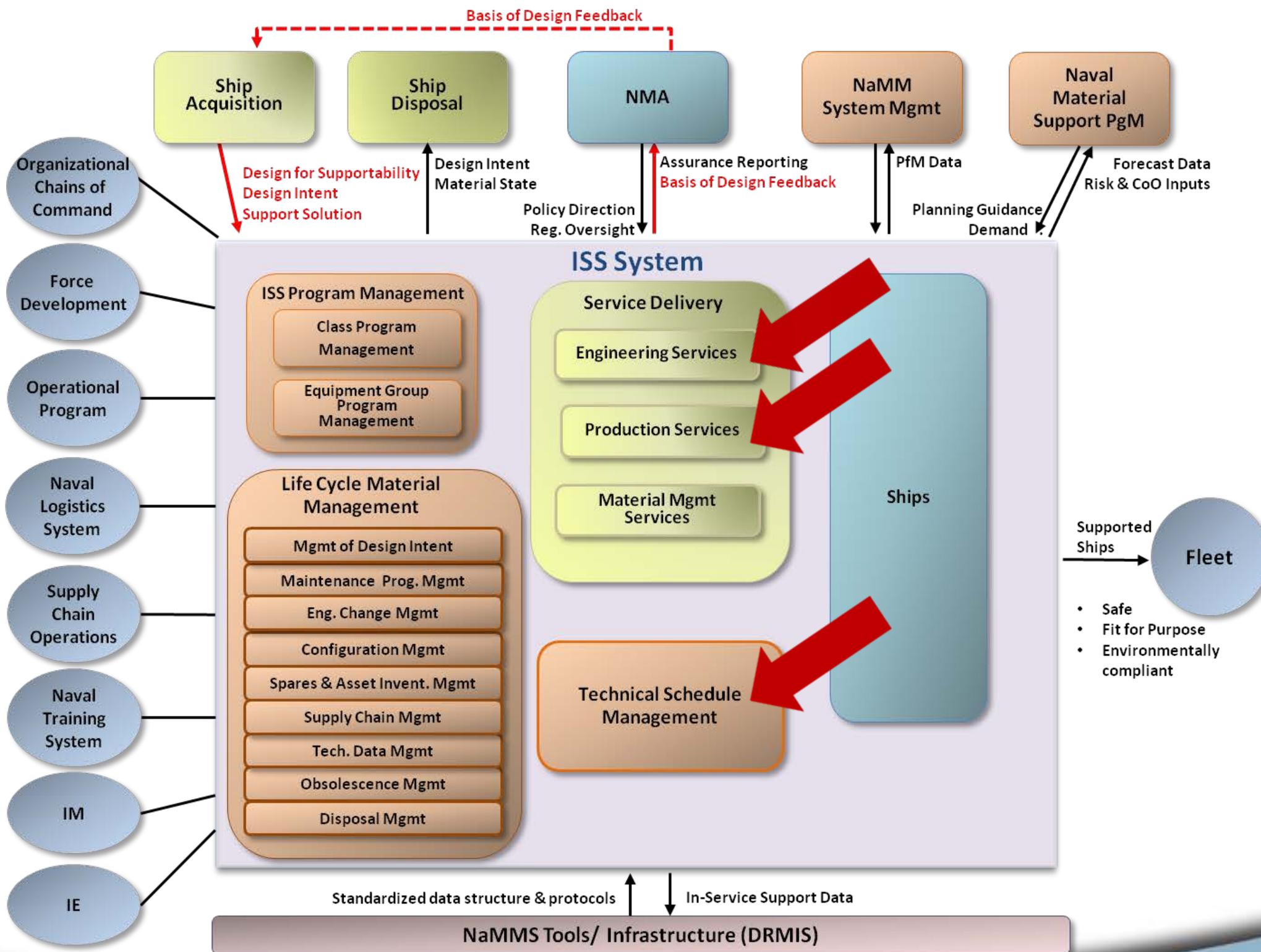
Agenda

- Aim of the visit
- **In-service Support Model**
- FMF Strategic Capabilities
- Tour of FMF Cape Breton





ISS System – Functional Element Model





Agenda

- Aim of the visit
- In-service Support Model
- **FMF Strategic Capabilities**
- Tour of FMF Cape Breton





Naval Engineering Maintenance Organisations

- DCOS Engineering Operations – N3

~20 per
Formation

- DCOS Formation Technical Authorities

~20 per
Formation

- Fleet Maintenance Facilities

MARP: 932 + ~160 mil

Cape Breton & Cape Scott

MARL: 958 + ~200 mil

- Base Information Services (BIS)

- Fleet Technical Officer – F

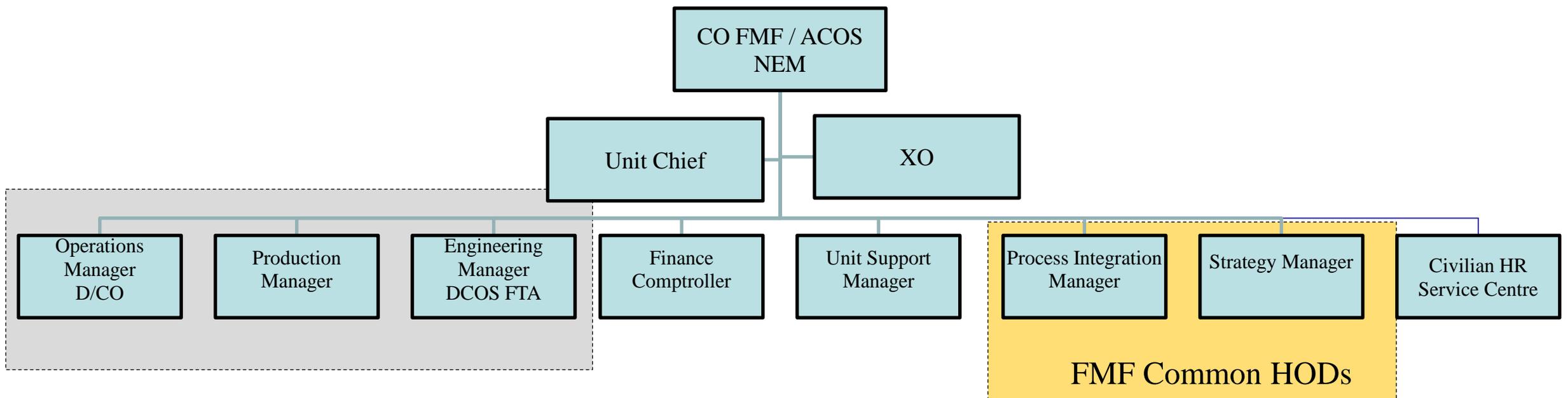
~1200 1st line
Technicians per
Formation

- Fleet Engineering Department





FMF Organization



Core Service Delivery Departments

- 4 Programme Managers
(project planning and scheduling)
- 7 Production Group Managers
(work period execution)
- 3 Engineering Division Heads
(Combat Systems, Marine Systems & Nav Arch)





FMF Engineering and Maintenance Activities

- 2nd Line – repair and/or minor overhaul of equipment
- 3rd Line – R&O, capability insertion and major overhauls of equipment in strategic areas (typically 30% of total effort)





FMF Business Lines

- **Support to Maritime Forces Atlantic and Pacific**
 - Running repair and scheduled work periods
 - Mission Fits
 - Engineering subject matter expertise
- **Support to Asst Deputy Minister (Materiel)**
 - Surveys & trials
 - Capability insertion
 - Halifax Class Modernization/Frigate Life Extension
 - Manufacturing
- **Centre of Excellence**
 - C4ISR, naval weapons & control systems
 - Obsolescent equipment & systems
- **Force Multiplier**
 - Strategic enabler for overall naval ISS capability and capacity





Integrated scope of activities

- Shore services (e.g. crane, rigging)
- Planned Maintenance (deferred level 1, level 2)
- Corrective maintenance:
 - RxR, MxE, Repairs
 - Fault-finding (intra and inter-systems)
 - Substitutions
 - Legacy systems and integration with Combat Systems
 - Set-to-work and performance Testing
- Mobile repair party (sustain mission)
- Installation of Engineering Changes/Mission fit
- 3rd line Repair and Overhaul; NICP (manufacture); Disposal
- Level 3 “refurbishment”
- Automatic Test Set (programming; go/no-go)
- Delegated Engineering Authority
- Development of complex Engineering Changes/Mission fit
- Certifications (e.g. lifting appliance, pressure vessels)
- Survey and Trials (Force Generation)
- Advice to MEPM (obsolescence, Technical Evaluations, Unsatisfactory Condition Reports)
- Future: recognized engineering organization





Coastal NEM Governance

Management Layer

N37
(Engineering Operations)

Defines macro **Schedule** thru TECHSKED Development

Defines Work **Scope**

Facilitates and Approves **Mobile Repair Parties**

FMF
Ops Dept

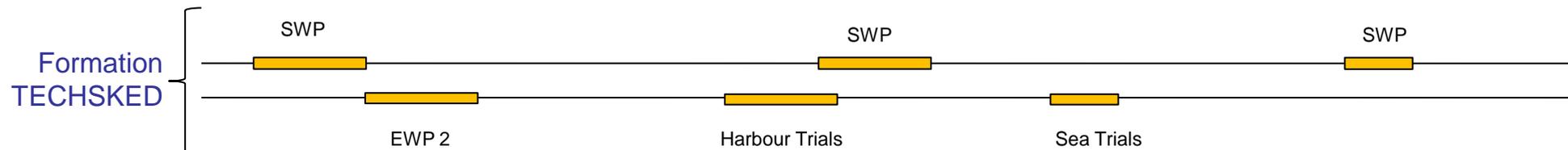
Manage work periods as **Projects**

Plan, Schedule and **Resource** jobs

Project **Control** and **Reporting**

Fleet Technical Authority

Manages Technical **Risk**



Service Delivery Layer

Executes assigned work for customers during defined work periods or as required to meet operational requirements





FMF Annual Operating Projection

Details the forecasted weekly FMF resources allocated to Fleet, Formation, and MEPM customers based on RCN priorities, *AND* used to focus resources during designated work periods alongside.

- Model using 5-year of historical data (known demand) and unit capacity to shape a more accurate forecast for:
 - Preventive maintenance load
 - Naval Materiel Assurance Requirements
 - Annual Engineering Change take-on lists
 - Repair and Overhaul Prioritization
 - Docking Work Period Catalogues
 - Historical corrective maintenance
 - Unit Capacity Available





Infrastructure

- New Consolidated Facility - 20 year capital project (FMFCB)
- Graving dock and Syncrolift can accommodate variety of vessels from submarines to frigates. However:
 - JSS ship are too large
 - Infrastructure cannot dock AOPS. Both facilities *may* be capable if upgrade feasible
- Co-location of similar trades
- Effective Materials Management (local procurement and national stock)
- Integrated Management System (ISO 9001 and 14001; CSA Z1000-14)





Work Centers

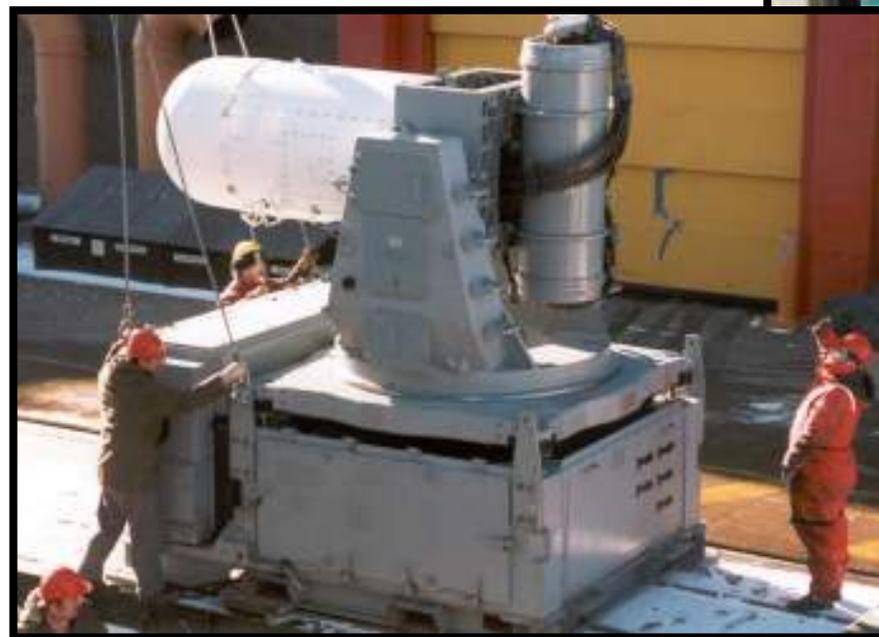
- Designed to be upgradeable.
- In-floor cable-trays for system cabling.
- Full services: air, water, 400hz, 440v, etc.
- Modern outfitting-cabinets & workbenches.
- Fitted with test beds.
- Rooftop antenna farm - operational over the air.
- Secure crypto facilities.





Hull, Metal Fabrication, Shipwright and Support Services

- Full range of skills for hull repair and metal fabrication.
- Heavy Marine Rigging.
- Chemical Cleaning Facilities.





Mechanical/Electrical Services

- Diesel engine and electric power skill sets for all onboard systems propulsion and power generation
- Unique facilities for submarine battery care





Communications

- Repair and maintain all communication equipment onboard ships and submarines (VHF, SHF, Satcom, etc)
- Internal Communications (SHINCOM)
- Crypto Systems





Weapons and Onboard Ammunition Systems

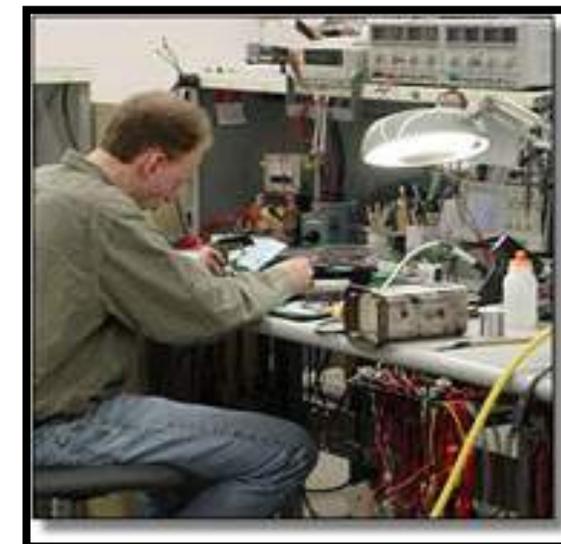
- Liaison/knowledge sharing with Original Equipment Manufacturers and Repair and Overhaul contractors
- Formation Ammunition Inspectors and staff at the CF Ammunition Depot





Fire Control/Electronic Repair

- Full range of fault-finding and maintenance capabilities for all shipboard navigation, radar, sonar, combat systems and fire control systems





Engineering Dept. – Key Activities

- Develop Job instructions
- Assist Production Department as required;
- Fault-finding/system level investigations; including Automated Test System Equipment
- Trials - ashore and at sea
- Assistance to the Design Authority with design and development at the equipment and systems level
- Drafting services
- Technical data management
- Development of Engineering Changes





Ranges

- Magnetic Ranges (measurement, calibration, deperming)
- Underwater Acoustic Signature Range (static, dynamic)
- Infrared signature measurement
- Naval Electronic Sensor Test Range (Radar Cross Section, antenna pattern analysis, directional accuracy)
- Weapons ranges (under-water, above-water)
- Multiple Unit Link Testing and Operational Training System – data link between ships, shore, non-naval units and NATO partners



** Access to range data requires Secret Level clearance





Test Beds

- Operational assets fitted into the shop. (i.e. Identification Friend/Foe and Electronic Support Measure Systems)
- Immediate support for ships or inventory items.
- Enables strong 2nd and 3rd level support with quick turn around times.
- Reproduce faults in ideal environments.
- Reduces risk to ship-fitted equipment.
- Provides for On-the-Job Training, used by schools for training
- Interconnected “like ship” and operational over the air (plain and encrypted)





Rooftop Antenna Farm

- Designed to allow for communications between FMF, ships alongside, and Test & Trials Range.
- Test beds capable of transmitting with associated antenna on the rooftop.
- Capable of plain or secure voice comm's to ships alongside or at sea.
- Upcoming installation of CEROS (Fire Control) and Smart-S (3D search radar) in both FMFs.





Special Tools & Test Equipment

- Equipment specific testers:
 - AQS 502 dipping sonar test bench
 - Victoria Class beacon calibrators
 - HF/UHF module test jigs

- Generic Test Equipment:
 - Microwave Signal generators, gauges, pulse generators, counters





Integrated Logistics

- Materials Management Systems program and barcode with digital photos.
- Pre-stage Materials, Ready-Use supplies and tool cribs.
- Off-site warehouses - bulk and long term storage.
- Environmentally controlled.
- Semi fixed, mobile and heavy lift cranes.
- Local purchase or National inventory.
- Fully integrated with DRMIS





Mobile Repair Parties

- Reach-back technical support is first step
- May sail with ships, including in theatre
- Work with factory reps and ship's staff
- Assemble/deploy multi-functional teams
- Short notice responsiveness

Recent Examples:

TOR – Maintenance Period in Kuwait

VDQ – DG failures off Somali

ATH – Air Conditioning off Haiti

CHA – Electronic Sensor faults

VAN – Fwd ranging for De-gaussing

ATH/HAL – Haiti earthquake,





Support to Other Elements

Belly plates and Shield for Army's Armoured Personnel Carriers used in Afghanistan





Air Force support frame for aircraft landing gear



Special Forces Small Boat Fuel Bladders





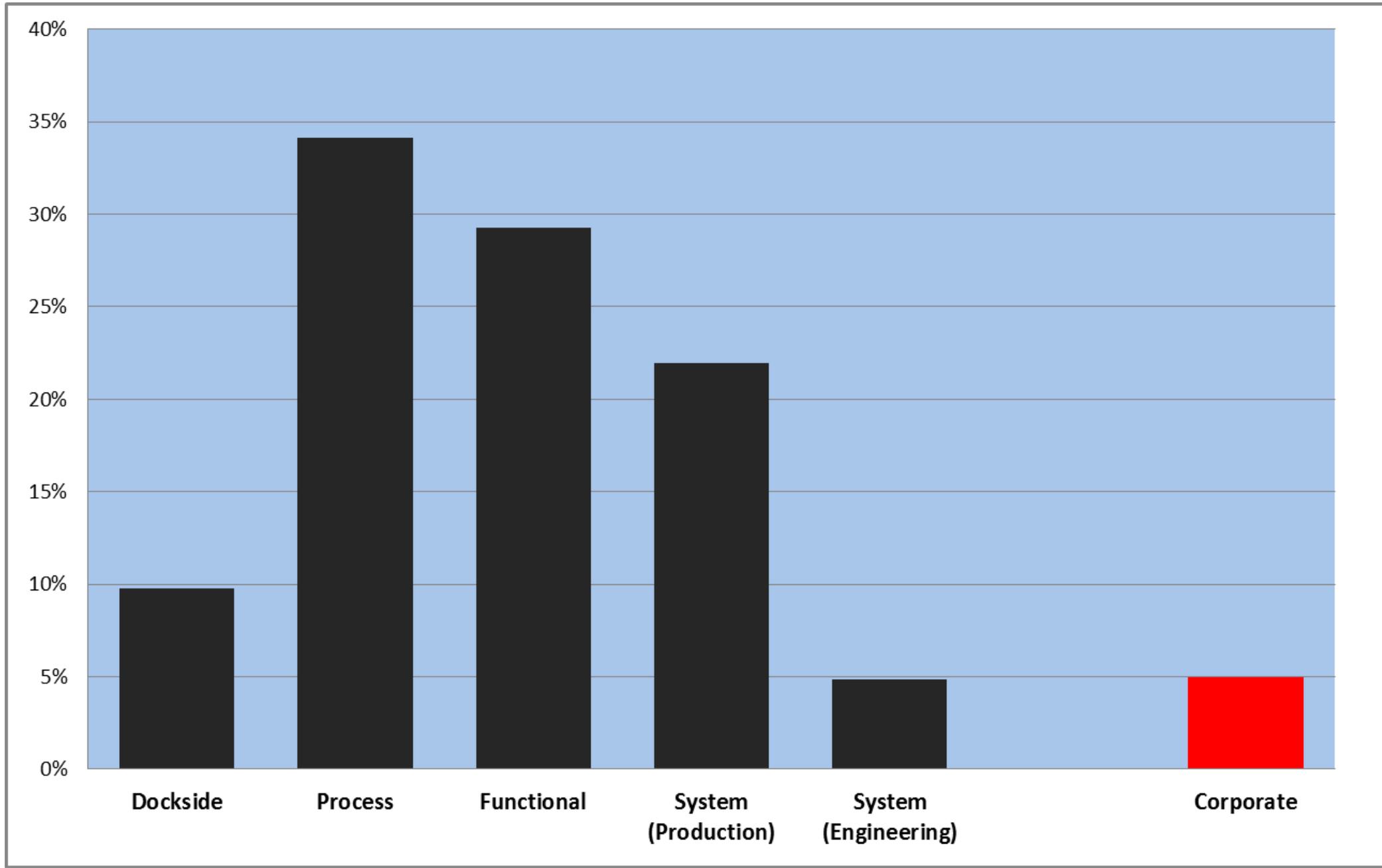
Capability Breakdown

- **Dockside Support:** Services such as rigging, cranes & scaffolding erection available to support FMF, contractor and ship staff work.
- **Process Support:** “Trade certified” support such as painting, lagging, shipwrights, electroplating, etc. System knowledge not required. Work completed according to standards and specifications.
- **Functional Specialties:** Work on many Combat and Platform systems but only on functions that are common to many systems such as: hydraulics, electrical, controls, ranges, inspectors, etc.
- **System Technical Experts:** Trained and experienced on specific systems:
 - Production: Engineering Change (EC) installation, maintenance & repair;
 - Engineering: EC design, repair specifications, troubleshooting, trials and analysis.





2nd line Maintenance Profile





Dockside Support Arrangements

| | |
|-----------------|---|
| D1 | Scaffolding and Weather Protection on Ships / Submarines Upper decks |
| D2 | Shore Facilities Connection: Power, Water, Steam, Breathing Air to ships and submarines |
| D3 | Crane Operations - Dockside to and From ship or submarine |
| D4 | Material Handling: Movement of Heavy Articles: Around Dockyard; to / from and onboard ships and submarines (Includes Pre Staging) |
| D5 | Complex Lifting / positioning and Lifting Arrangement Set up and Appliance Testing |
| D6 | Synchrolift / Dry-dock Operations and Support |
| D-SPTATE | The FMF has the Special Facilities, Plant, Tools and Test Equipment required to fully support D, DC and CD Systems |





Process Support Arrangements

| | |
|-----------------|---|
| S1 | Manufacturing (Support to All classes / or prall systems and equipment) |
| S1A | Manufacturing - Steel Fabrication and Finishing |
| S1B | Manufacturing - Sheet Metal Fabrication and Finishing |
| S1C | Manufacturing - Tools, Components, Parts, Fasteners, Piping and Jigs |
| S1D | Laser Additive / Machining - Components, Parts, Fasteners, |
| S1D | Manufacturing - Foundry / Oven / Heat Treatment |
| S2 | Fabrication and Installation: Ship board Mounts, Hull Inserts, Brackets and Fixtures |
| S3 | Cleaning and (Re)finishing / (Re)surfacing (All Materials) |
| S3A | Hull and Decking Including Equipment and Fixtures |
| S3B | Free Flow Equipment's and Components |
| S4 | Pipe works and coatings. Manufacture - Inspect - Remove - Replace - Install |
| S5 | Opening and closing shipping routes |
| S6 | Asbestos Abatement / Lead Abatement |
| S7 | Engraving and Signage (Damage Control) |
| S8 | Warehousing and Storage |
| S9 | Material Support - Procurement / CFSS |
| S-SPTATE | The FMF has the Special Facilities, Plant, Tools and Test Equipment required to fully support D, DC and CD Systems eg: LAM, Water Table, Plasma etc |





Functional Support Arrangements

| | |
|--------------------|---|
| F1 | System / Equipment Connection to Ship Main / Support Systems - Equipment Connection, Disconnection and Temporary Isolation - Tests and Trials |
| F2 | Interference Item Removal, Re-installation and Testing |
| F3 | System / Equipment - Component Testing, Inspection and / or Repair and Trials including NDT and DI |
| F3 Ammo | Ammunition Storage and Handling Inspection |
| F4 | Ships cabling, Connectorization and Testing |
| F5 | Heavy Electrical Shored Based Services- Load Bank Testing and Battery Care |
| F6 | Hull Survey and Repair (Temporary and Permanent) |
| F7 | Electronic System Test Bed Arrangements and Support Services |
| F8 | Test Equipment Calibration and Repair |
| F9 | Sensor / EW / COMM System Ranging and Testing |
| F10 | Ship Signatures: Infra-Red - Heat, RCS - Radar Cross Section, Acoustic, Magnetic, System Electromagnetic (EW Threat) |
| F11 | Ship Degaussing |
| F12 | Citadel Testing and Reconciliation |
| F-SPTATE | The FMF has the Special Facilities, Plant, Tools and Test Equipment required to fully support D, DC and CD Systems |





System Technical Expertise – Production Arrangements

| | |
|-----------------|--|
| P1 | System and Equipment Diagnostics & Inspection: Shipboard |
| P2 | System and Equipment Diagnostics & Inspection: Bench / Shop |
| P3 | System and Equipment Removal / Repair / Installation |
| P3A | System and Equipment Removal, Inspection and Forwarding to CFSS |
| P3B | System and Equipment Repair and Overhaul (NICP) |
| P3C | System and Equipment Receipt from CFSS and Pre-Installation Testing |
| P3D | System and Equipment Repair by Replacement |
| P3E | System and Equipment Repair in Place |
| P3F | System and Equipment Installation |
| P3G | System and Equipment Set To Work |
| P4 | Directed Planned Maintenance |
| P5 | Ship and System Disposal |
| P-SPTATE | The FMF has the Special Facilities, Plant, Tools and Test Equipment required to fully support D, DC and CD Systems |





System Technical Expertise – Engineering Arrangements

| | |
|------------|---|
| E1 | Systems Engineering & Performance Analysis |
| E1A | Combat, Marine and Hull Systems Integration |
| E1B | Combat and Marine System Introduction |
| E1C | Combat, Marine and Hull Systems Performance Studies |
| E1D | At Sea Data Collection and Analysis |
| E1E | Technical Investigations |
| E1F | Automated Test Systems Engineering |
| E1G | Ship Stability, Buoyancy and Strength |
| E1G | Ship Inspections and Surveys |
| E2 | Engineering & Design |
| E2A | Engineering Changes |
| E2B | Repair Specifications and Instructions |
| E2C | Engineering Deviations and Waivers |
| E3 | Alignment & Calibration |
| E3A | Weapon System Mechanical Alignment |
| E3B | Weapon System Electronic Alignment |





System Technical Expertise – Engineering Arrangements *(cont'd)*

| | |
|-----------------|--|
| E4 | Test, Trials & Certification |
| E4A | Conduct of Physical, Functional and Sea Trials |
| E4B | Conduct of Condition Based Assessments |
| E4C | Produce / Amend Test and Trials procedures |
| E4D | Weapons Certification |
| E4E | Ship Safety Certification |
| E5 | Produce and Control Technical Drawings and Specifications |
| E6 | Designated Engineering Authority: Second and Third Level Oversight |
| E7 | Engineering Advice and Distant Support |
| E8 | Engineering Advice to Naval Authorities |
| E-SPTATE | The FMF has the Special Facilities, Plant, Tools and Test Equipment required to fully support D, DC and CD Systems |





Corporate Support Arrangements

| | |
|-----------------|--|
| C1 | Safety and Environmental Protection Services |
| C1A | HAZMAT Storage and Handling (Including Spill Response) |
| C1B | Gas Free Certification |
| C1C | RADHAZ Testing and Lock out Services |
| C1D | Fire Sentry Services |
| C3 | IT / DRMIS Support |
| C4 | Industrial Engineering and Plant Maintenance (Dockside Facilities) |
| C5 | Waterfront Project Management - HMC Dockyards and Deployed |
| C6 | Security: Physical, EMSEC, ITSEC, ITAR and CTAT |
| C-SPTATE | The FMF has the Special Facilities, Plant, Tools and Test Equipment required to fully support D, DC and CD Systems |





Agenda

- Aim of the visit
- In-service Support Model
- FMF Strategic Capabilities
- **Tour of FMF Cape Breton**





FMFCB tour

- Safety
- Groups (OPI: PSPC)

