THE PHILIPPINE AEROSPACE INDUSTRIES ROADMAP

INDUSTRY GROWTH AGENDA OVER A TEN (10) YEAR PERIOD (2013-2022)

PRESENTED BY:
THE AEROSPACE INDUSTRIES ASSOCIATION OF THE PHILIPPINES (AIAP)
VISION

For the Philippines to be a major hub for manufacturing of OEM parts and allied services (MRO) for the global commercial aircraft industry.
To be the leading organization, enabling partnerships and serving as collective voice of the stakeholders, in promoting growth and development of the Philippine aerospace industry.

- Promote and establish business collaboration and integration to support competitiveness in product cost, quality and delivery.

- Promote a culture of excellence in manufacturing through technical competence in manpower, advanced manufacturing technologies, and advanced quality systems.

- Serve as liaison of the memberships in influencing government policies and development programs: partnering with government and established institutions to revitalize and elevate the state of Philippine aerospace industry.
STATE OF THE INDUSTRY
THE PRODUCTS

BOEING 787 PRIMARY & SECONDARY FLIGHT CONTROLS
THE PRODUCTS
AIRBUS A350XWB PRIMARY & SECONDARY FLIGHT CONTROLS
THE PRODUCTS
GALLEY EQUIPMENT
THE PRODUCTS
OTHER POTENTIAL PRODUCTS

Seats
Wiring Harness
Oxygen Systems
Potable Water and Vacuum Waste System
Thermal and Power Management
Lighting Systems
THE GROWING GLOBAL MARKET

New airplanes
Deliveries by region

<table>
<thead>
<tr>
<th>Region</th>
<th>New airplanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Pacific</td>
<td>12,820</td>
</tr>
<tr>
<td>Europe</td>
<td>7,460</td>
</tr>
<tr>
<td>North America</td>
<td>7,250</td>
</tr>
<tr>
<td>Middle East</td>
<td>2,610</td>
</tr>
<tr>
<td>Latin America</td>
<td>2,900</td>
</tr>
<tr>
<td>CIS</td>
<td>1,170</td>
</tr>
<tr>
<td>Africa</td>
<td>1,070</td>
</tr>
<tr>
<td>Total</td>
<td>35,280</td>
</tr>
</tbody>
</table>

Delivery units

- 2013 to 2032 New airplanes 35,280
- Asia Pacific 36%
- Europe 21%
- North America 21%
- Middle East 7%
- Latin America 4%
- CIS 3%
- Africa 2%
- Other 8%

Source: BOEING – Current Market Outlook – 2013-2032 – (Internet data)
Components value as a % of aircraft value

- Airframe: 38%
- Engine: 27%
- Systems: 14%
- Avionics: 11%
- Interior: 6%
- Landing Gear: 4%

Sources: Wipro, Clearwater
SEA COUNTRY EXPORTS (1995-2010)

Source: World Trade Services
<table>
<thead>
<tr>
<th>COUNTRIES</th>
<th>AEROSPACE INDUSTRY</th>
<th>INVESTMENT/CONTRIBUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaysia</td>
<td>• Greater industry collaboration and synergy through an industry association</td>
<td>RM 3.1 billion or US$ 1 billion</td>
</tr>
<tr>
<td></td>
<td>• Government to provide human capital development</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• MMITI as the “one stop” center for facilitating industry investment</td>
<td></td>
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<tr>
<td>Thailand</td>
<td>• Full support from the government and maximum incentives from the BOI</td>
<td>US$ 234.4 million</td>
</tr>
<tr>
<td></td>
<td>• Capable and efficient work force, cost effective inputs and other support industries</td>
<td></td>
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<tr>
<td></td>
<td>• 30 approved aerospace repair stations versus 224 international</td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>• Has used state resources to develop aircraft industry since 1976</td>
<td>Rp.2 trillion ($234 million)</td>
</tr>
<tr>
<td></td>
<td>• PT. Dirgantara Indonesia, a state-owned factory, consists the aerospace industry</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Immediately went into aircraft production without slowly going through OEM, sub-assemblies or MRO</td>
<td></td>
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<tr>
<td>Singapore</td>
<td>• Number one MRO hub in Asia</td>
<td>US$4.6 billion</td>
</tr>
<tr>
<td></td>
<td>• Adopted multi-prong approach to build full value chain clusters:</td>
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<tr>
<td></td>
<td>- build Seletar Aerospace Park</td>
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<td></td>
<td>- attract investments from global aerospace major players</td>
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<tr>
<td></td>
<td>- assist SMEs to compete through business alliances, QMS, and capability development programs</td>
<td></td>
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<tr>
<td></td>
<td>- air shows and supplier conferences</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- establish an R &amp; D cluster</td>
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<tr>
<td></td>
<td>- develop engineering talent through education</td>
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</tbody>
</table>
# PHILIPPINE REVENUE PROJECTIONS

For the Ten-Year Period (2013-2022)  
(In USD Million)

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Amounts Projected</td>
<td>385</td>
<td>592</td>
<td>779</td>
<td>958</td>
<td>1,120</td>
<td>1,176</td>
<td>1,235</td>
<td>1,297</td>
<td>1,361</td>
<td>1,429</td>
<td>10,332</td>
</tr>
<tr>
<td>OEM</td>
<td>385</td>
<td>592</td>
<td>779</td>
<td>958</td>
<td>1,120</td>
<td>1,176</td>
<td>1,235</td>
<td>1,297</td>
<td>1,361</td>
<td>1,429</td>
<td>10,332</td>
</tr>
<tr>
<td>MRO</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Employment Generation</td>
<td>2,200</td>
<td>3,600</td>
<td>4,500</td>
<td>5,600</td>
<td>6,500</td>
<td>6,800</td>
<td>7,200</td>
<td>7,500</td>
<td>7,900</td>
<td>8,300</td>
<td>-</td>
</tr>
</tbody>
</table>

**Notes:**
1.) Source: Five-year data from consolidated business projections. Tier 1,2,3 suppliers.
2.) MRO Projections not included.
3.) Assumed increase of five percent (5%) per year starting 2018.
PRODUCT VALUE CHAIN ANALYSIS

SOURCE COUNTRIES:
USA, CAN, UK, SG, EU

ASIAN SUPPLY CHAIN
Singapore: ACP, STK, HTK, ATC
Singapore: SETSCO, STK, ACP, HTK

LEGEND:
Gaps

T1
MOOG, BE, JAMCO
AAPMC, API
FSPMI, ONA, PPI, JFS

T2
MOOG, BE, JAMCO
MOOG
MOOG
MOOG, BE, JAMCO
MOOG, BE, JAMCO

T3
KAPCO, MIR
DC
MIRDC

CEVA, SDV, SCHENKER
MANLY, etc.

FINE MACHINING (Grind, hone, lap)
POTENTIAL COST REDUCTION

- **Cost Reduction**
  - A. Local Distribution of Material
  - Local Special Processing
  - Local Finishing Processes
CHALLENGES
PRODUCTION AND PROCESS CAPABILITY
- High-end machine tools and metrology equipment
- Fine Machining (hone, fit, lap, extrude hone, deburr equipments)
- Heat treat, surface treatment processes
- Gear manufacturing
- Non-destructive inspection (NDI) and plating/metallurgical testing
- Gen. functional testing for compliance to aerospace requirements
- Chemical test / Solution test compliant to aerospace requirements

HIGH CAPITALIZATION ON MACHINE TOOLS AND METROLOGY EQUIPMENTS

SUPPLY CHAIN INTEGRATION
- Raw material supply/distribution (MIL/AMS Specs)
- Transport and import/export turn-around
- Complete process capability in the supply chain
- Toolings & chemical supply distribution
TRAINING AND EDUCATION

- CNC machining/programming and advanced metrology
- Surface treatment and testing technology
- Heat treat and testing technology
- Gear manufacturing and metrology
- Advanced Metrology
- AS9100 accreditation training
- NADCAP accreditation training

AVAILMENT AND IMPROVEMENT OF GOVERNMENT PROGRAMS AND INCENTIVES FOR POTENTIAL INVESTORS ON PROCESS CAPABILITIES

- e.g. PEZA /BOI/DTI/DOST/MIRDC/TESDA
WHERE GOV’T CAN HELP
WHERE GOV’T CAN HELP

PRODUCTION AND PROCESS CAPABILITY

• Enlist provision of government incentives for high capital investments intended for aerospace manufacturing.
  - e.g. long-term leases, lease subsidies, tax holidays, zero interest, credit facility provision, loan guarantees
• Encourage government to spearhead provisions for training and development of critical processes to bridge gaps in the supply chain.
  - e.g. NDI / surface treatment / metallurgical test facility / gear manufacturing / heat treatment / precision machining and metrology / special testing per AS standards
SUPPLY CHAIN INTEGRATION

- Encourage development of local businesses conforming to aerospace standards e.g.
  
a) Raw material distribution / trading (steel, aluminum, castings, forging, etc.)
b) Chemical supplies, i.e. oils, lubricants, plating chemicals
c) Tool supplies and refurbishing, i.e. cutting tools, tool coating, tool grinding
d) Plating and coating process (anodize, alodine, CAD plating)
e) Heat treat processes
   - Nitriding
   - Vacuum heat treat with subzero
   - Carburizing
TRAINING/ EDUCATION

- Continuous improvement on existing programs for CNC machining and manufacturing technology and advanced metrology (TESDA, MIRDC, DOST)
- Revival of surface treatment, chemical and, heat treat technology training programs (TESDA, MIRDC, DOST)
- Provision for accreditation trainings on aerospace quality management systems and certifications, i.e. AS9100, NADCAP
- Creation of training programs and training facility for gear manufacturing and metrology

GOVERNMENT PROGRAMS AND INCENTIVES

- Information drive on existing government programs and incentives, e.g. PEZA, BOI/DTI/DOST/MIRDC/TESDA
- Continuous review and improvement of policies and incentives supportive of the aerospace industries.
- Inclusion in government promotions and programs i.e. advertisements, trade fairs, exhibitions / conferences, counter-trade
- Investment missions / promotions for other OEM suppliers
Policy Reforms

• Inclusion of Aerospace Manufacturing as a pioneering industry with extension of Tax Holidays from 4-6 years to 6-8 years in 2014 Investment Priority Plan (IPP)
• For government institutions to fill out the supply chain gaps through investments on training & development on process capabilities, e.g. surface finishing, special testing, gear manufacturing, and NDI.
• For government to support training programs and certifications related to Aerospace Manufacturing.
• Improve/create tax and investment incentives to those who will qualify to 2014 IPP under Aerospace Manufacturing to encourage more investors and players.
• For government to maintain status of the Philippines as a Category 1 Country by International Aviation Regulatory Standards.
Clearing Administrative Bottlenecks

- Streamline import/export lead times and procedures for faster transaction processing in line with the needs of the business processes.
- Make government programs and incentives more attractive to entice investors to come in or for buyers to look at Philippines as a country source.
- Fill the supply chain process capability gaps to complete the supply chain integration.
- Identify logistical bottlenecks and propose improvements.
Projects

• Support Industry Accreditation to Aerospace Standard (AS 9100, NADCAP, etc)
• Encourage Investments and Trainings on NDI, surface finishing, gear manufacturing, composites manufacturing and other special processes to fill the supply chain gaps.
• Provide the same trainings and investments thru DOST/MIRDC funded programs to fast track development of services not available in the supply chain.
REVENUE GROWTH POTENTIALS
REVENUE GROWTH POTENTIALS

REVENUE PROJECTIONS AND POTENTIALS
In US$M

With Positive Program Intervention (Dreamline)
Private Lead

Graph showing revenue growth projections from 2013 to 2022 in US$M.
REVENUE GROWTH POTENTIALS
SEA COUNTRY EXPORTS & PROJECTIONS (1995-2022)

US$ Million

PAST

FUTURE

Source: World Trade Services
BUDGET FOR AIAP PROGRAMS
# BUDGETARY ESTIMATES FOR AIAP PROGRAMS

## I. Capital Investments (PHP)

<table>
<thead>
<tr>
<th>Item</th>
<th>CY 2014</th>
<th>CY 2015</th>
<th>CY 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Magnetic Particle Equipment</td>
<td>3,000,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Demagnetizing Equipment</td>
<td></td>
<td>1,000,000</td>
<td></td>
</tr>
<tr>
<td>c. Fluorescent Penetranat Tanks</td>
<td></td>
<td>1,000,000</td>
<td></td>
</tr>
<tr>
<td>d. Met Lab upgrade</td>
<td>2,000,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Chem Lab upgrade</td>
<td>2,000,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Computers and Software for 3D Modelling</td>
<td></td>
<td>1,500,000</td>
<td></td>
</tr>
<tr>
<td>g. Gear Grinder</td>
<td>50,000,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>h. Gear Measuring Equipment</td>
<td>5,000,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>j. Tool Cutter Grinding</td>
<td>2,000,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>k. Vacuum Heat Treat with Subzero</td>
<td>50,000,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>l. Nitriding</td>
<td>30,000,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>m. Vacuum Carburizing</td>
<td>50,000,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n. Waste Treatment</td>
<td>5,000,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>o. CNC Horizontal Mill</td>
<td></td>
<td>25,000,000</td>
<td></td>
</tr>
<tr>
<td>p. Flammability Testing Equipment (FAR 25)</td>
<td>5,000,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>q. CNC Turn/Mill</td>
<td></td>
<td>25,000,000</td>
<td></td>
</tr>
<tr>
<td>r. Finishing Equipments</td>
<td></td>
<td>10,000,000</td>
<td>10,000,000</td>
</tr>
<tr>
<td>s. Thermoforming</td>
<td>10,000,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>t. Composites Mfg.</td>
<td>10,000,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>u. Large capacity anodizing</td>
<td>10,000,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## II. Training and/or Certification

<table>
<thead>
<tr>
<th>Item</th>
<th>CY 2014</th>
<th>CY 2015</th>
<th>CY 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. GD&amp;T (Geometric tolerancing)</td>
<td>1,000,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. AS 9100 Consultancy/Training</td>
<td>1,000,000</td>
<td>1,000,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>c. NADCAP Consultancy/Training</td>
<td>1,500,000</td>
<td>1,500,000</td>
<td>1,500,000</td>
</tr>
<tr>
<td>d. Post Processing/Automated CNC</td>
<td>1,000,000</td>
<td>1,000,000</td>
<td>1,000,000</td>
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<tr>
<td>e. Basic Gear Machining and Nomenclature</td>
<td>2,000,000</td>
<td>2,000,000</td>
<td></td>
</tr>
<tr>
<td>f. Surface Treatment Technology</td>
<td>1,500,000</td>
<td>1,500,000</td>
<td>1,500,000</td>
</tr>
<tr>
<td>g. Heat Treatment Technology</td>
<td>1,500,000</td>
<td>1,500,000</td>
<td>1,500,000</td>
</tr>
<tr>
<td>h. Waste Treatment Technology</td>
<td>1,500,000</td>
<td>1,500,000</td>
<td>1,500,000</td>
</tr>
<tr>
<td>i. Machine Maintenance</td>
<td>1,000,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>j. Thermoforming</td>
<td>1,500,000</td>
<td>1,500,000</td>
<td>500,000</td>
</tr>
<tr>
<td>k. Composites Manufacturing</td>
<td>1,500,000</td>
<td>1,500,000</td>
<td>500,000</td>
</tr>
</tbody>
</table>

**TOTALS** 13,500,000 249,500,000 71,000,000

**LEGEND**
- DELIVERED
- PARTLY DELIVERED
RECOMMENDATIONS
At this stage of the development, we propose the following:

- We seek continued policy & administrative guidance from the BOI Industry Development Council thru regular status reviews of AIAP activities.
- On a technical level, we propose to partner with DOST-MIRDC to spearhead the industries development course, in planning and implementation of AIAP programs similar to successes achieved with related industry associations, particularly MIAP & PDMA.
- The DOST-MIRDC / AIAP partnership should pave the way for government funding appropriations where critical programs in the development of the aerospace industry are needed particularly on process capability building, supply chain integration, and training & education.
CONCLUSION
A successful and sustainable aerospace manufacturing industry must fully engage the cooperation and support of the government.

The aerospace industry is in a rare opportunity for the country to take advantage of, with the confluence of events in the growth of the Asian aerospace industry.

This development is a most opportune time for the Philippines to regain its image as a major technology contributor.
“This is an important project because it marks a new kind of manufacturing. We are moving up the value chain, and today marks the foothold we have secured in the aerospace supply sector.”

October 3, 2012 – Excerpts from President Benigno Aquino’s speech during the Inaguration of B/E Aerospace facility in Tanuan, Batangas