

Chihuahua's
AEROSPACE
Cluster



Development of the Aerospace Industry in Chihuahua

2013 - 2023



TEC de Monterrey
DEL SISTEMA TECNOLÓGICO DE MONTERREY



Chihuahua
Gobierno del Estado

SE

SECRETARÍA DE ECONOMÍA



PRO MÉXICO
Inversión y Comercio

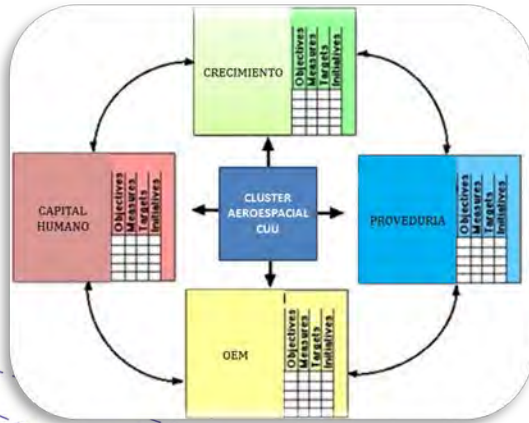


index 30
Chihuahua
30 años

Strategic Planning

CACH - 10 Model

Balance Scorecard / KPI'S



Policy Deployment Matrix



EDUCATION



Vision

Diagnosis

Synergy

GOVERNMENT

INDUSTRY

Positioning



Strategic Initiatives



Employees - Global Aerospace Industry

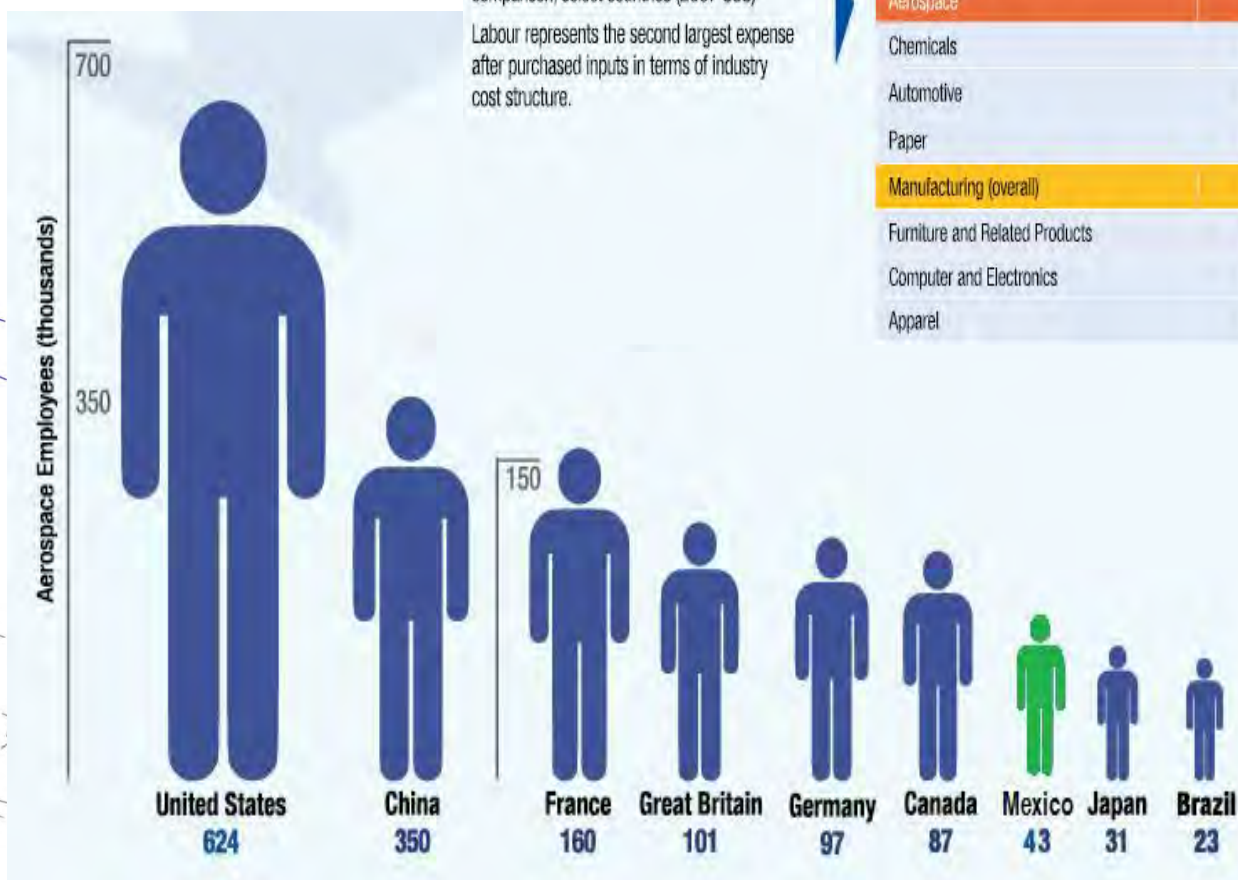
➤ **Approx. 2 million jobs**

Elevated Skills and Wages

Global median hourly wages, sector to sector comparison, select countries (2007 \$US)

Labour represents the second largest expense after purchased inputs in terms of industry cost structure.

Manufacturing Sector	\$ US
Petroleum and Coal Products	\$ 46
Aerospace	\$ 45
Chemicals	\$ 36
Automotive	\$ 30
Paper	\$ 30
Manufacturing (overall)	\$ 28
Furniture and Related Products	\$ 22
Computer and Electronics	\$ 20
Apparel	\$ 14



4 main stages for Chihuahua's Aerospace Cluster



● Aerospace Cluster Initiatives

Technology

- 1 Development of manufacturing capabilities to establish an aircraft MRO center and definition of a technological road map for 2023.

Education

- 2 Education curriculum alignment between the industry requirements and the Academia (Theory & Praxis).

Supply Chain

- 3 Project to integrate and develop the aerospace supply chain.

Certification

- 4 Development of a strategy to get the necessary certification capabilities in Chihuahua.

Infrastructure

- 5 Development of the needed infrastructure for the aerospace industry

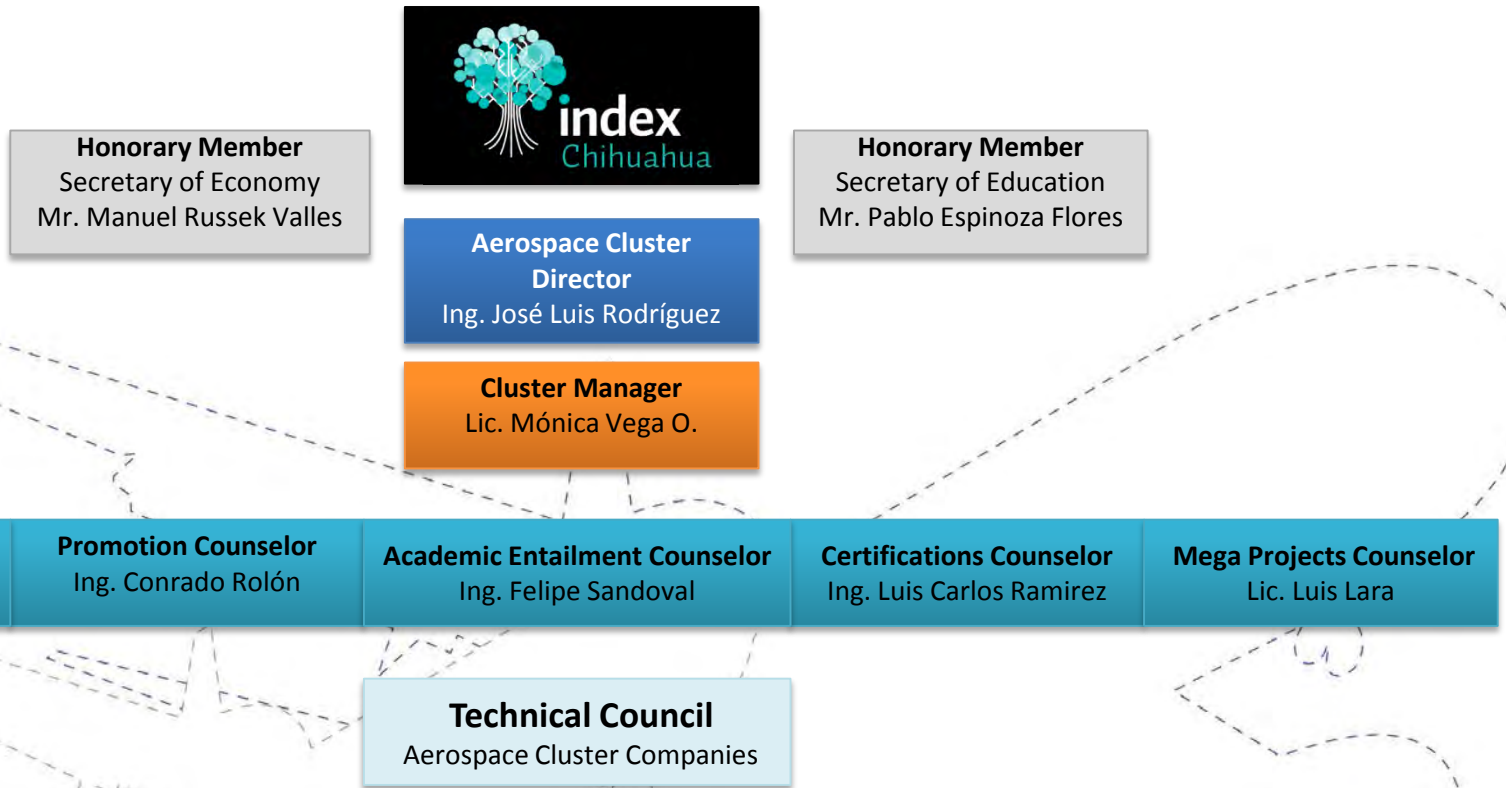
Promotion

- 6 Positioning of Chihuahua's Aerospace Cluster on the international arena

1

- Aerospace Cluster Integration

Aerospace Cluster Organization Chart



KPIs

Chihuahua is one of the most important Aerospace Clusters in Mexico with the following indicators:



**Aerospace Cluster
with 4 OEMs**



**32 aerospace
certified suppliers**



**>4,000,000 Sq Ft of
industrial floor**



**>13,000 direct labor force=
>\$150M USD in payroll and
>\$450M USD in indirect jobs
(economic spillover)**



**> \$1,000M USD in local
and foreign investment**



> \$750M USD annual exports

These indicators are the result of the teamwork of the triple helix: Industry, Academia and Government



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Technological Road Map for Aerospace Industry in Chihuahua

2013 - 2023

Aerospace Industry in Chihuahua 2013-2014



Define the technological capacity currently established in Chihuahua and what is being targeted short term.

Stage

1

June - August

Define a Road Map
Support of Universities of Wichita and / or Toulouse and External Consultants to define the action plan for 2023.

Stage

2

September - December

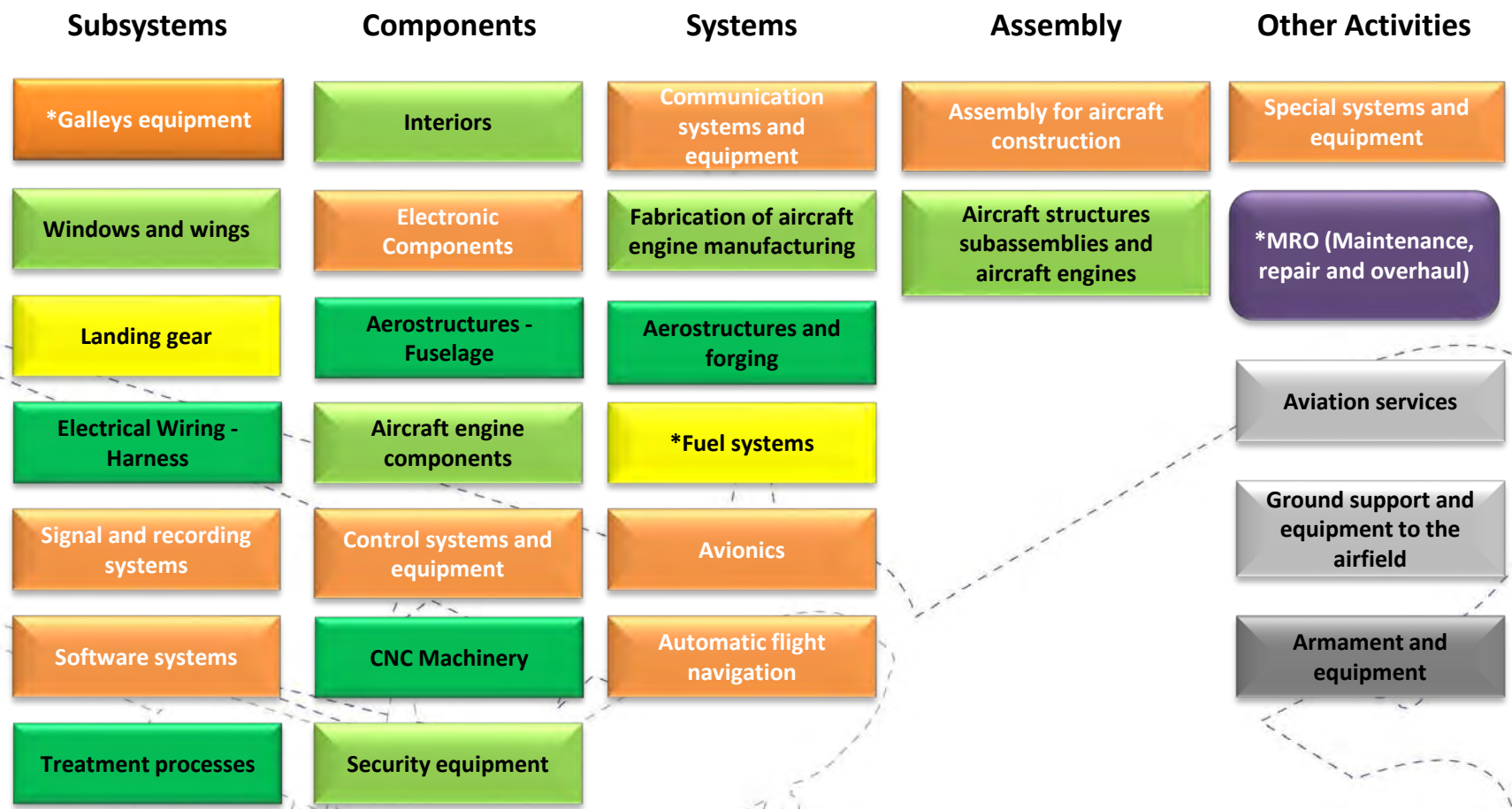
Virtual Representation of Road Map in stages.

Stage

3

January - March

Stage 1 : Chihuahua's Aerospace Analysis



* On the radar

High participation	Participation	Low participation	No participation
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Main Components








1. ● NDT Services , Penetrant Inspect
2. ● Chemical Conversion (Alodine)
3. ● Chromic Acid Anodize
4. ● Boric/Sulfuric Acid Anodize
5. ● Primer Applications
6. ● Top Coat Applications
7. ● Fuel Tank
8. ● Inspection Services
9. ● Blasting and Polish Services
10. ● Sulfuric Acid Anodize

- Current capacity in Chihuahua
- Partial capacity

11. ● Passivation
12. ● Cadmium Plating
13. ● Hard Chrome Processing
14. ● Phosphate Fluoride Processing
15. ● Nickel Plating
16. ● Electroless Nickel Plating
17. ● Zinc Nickel Plating
18. ● Manganese Phosphate Coating
19. ● Shot Peening
20. ● NDT Services
21. ● Magnetic Particle Inspection
22. ● Cadmium Plating *2014
23. ● Passivate *2014
24. ● Dry Film Lube *2014



Design Capabilities

Products / Processes	High Participation	Participation	Low Participation	No participation
Electrical Wiring Harness				
Seats				
Turbines				
Aerostructures				
Others				

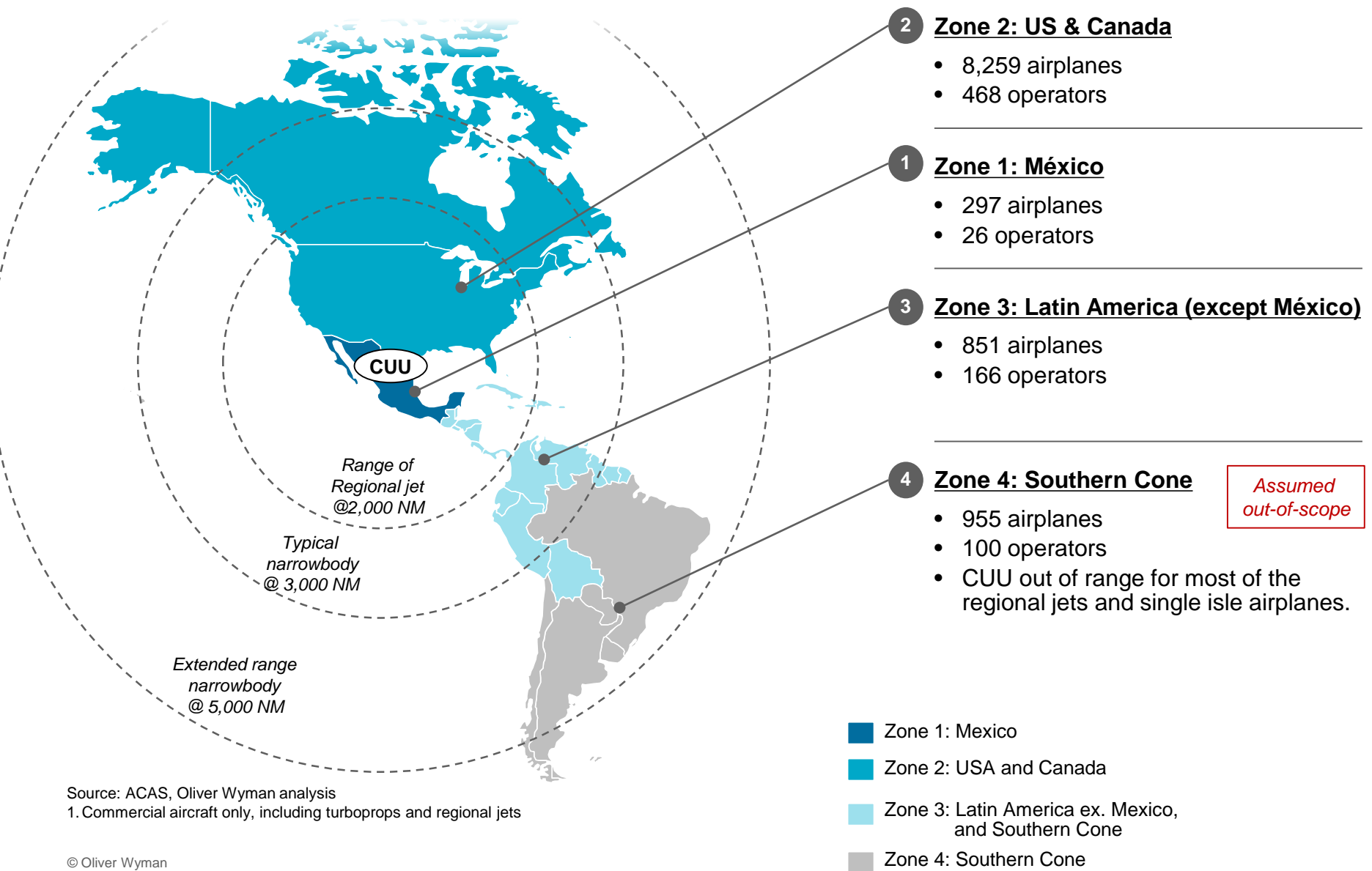
For further information please contact Chihuahua's Aerospace Cluster.



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MRO PROJECT

1 In Chihuahua, the new frames MRO Center has a potential market of about 10.000 airplanes¹



Source: ACAS, Oliver Wyman analysis
1. Commercial aircraft only, including turboprops and regional jets

MRO Chihuahua





Aerospace Industry in Chihuahua 2013-2014

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Stage 2

September - December

Virtual Representation of Road Map in stages.

Stage 3

January - March

1° Workshop

Secretariat of Economy

Presentations

- Delegate Federal Ec.
- Sec. de Economy
- ProMéxico
- Aerospace Cluster
- Tec de Monterrey

Teams integration

Expected Outputs



2° Workshop

PIT2 – PIT3

ProMéxico

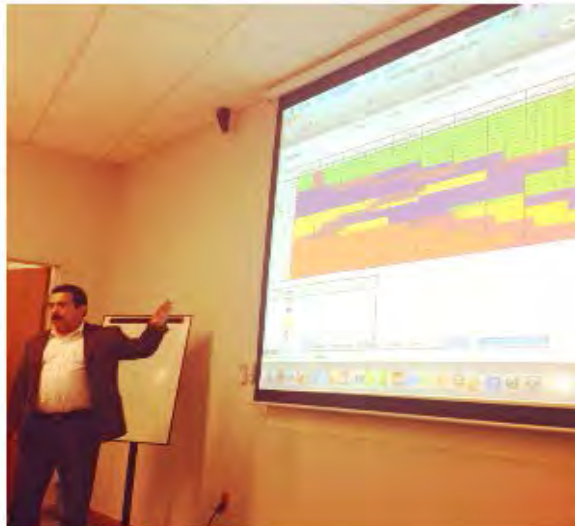
Presentations

- Interiors
- Design
- Wiring
- Aerostructures
- Various
- Engines

Success Story: Innovation

Tour PIT3

Draft Road Map



3° Workshop

Index Chihuahua

ProMéxico - TRM

Consolidation

Teams - initiatives

Final Conclusions



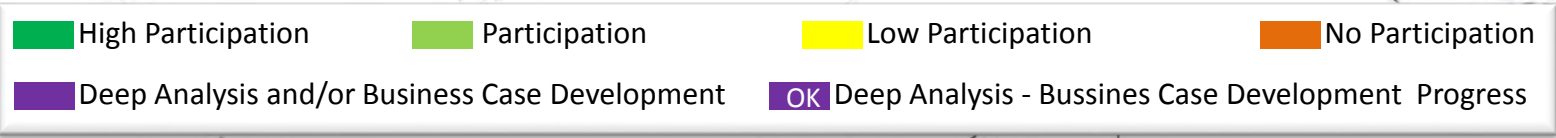
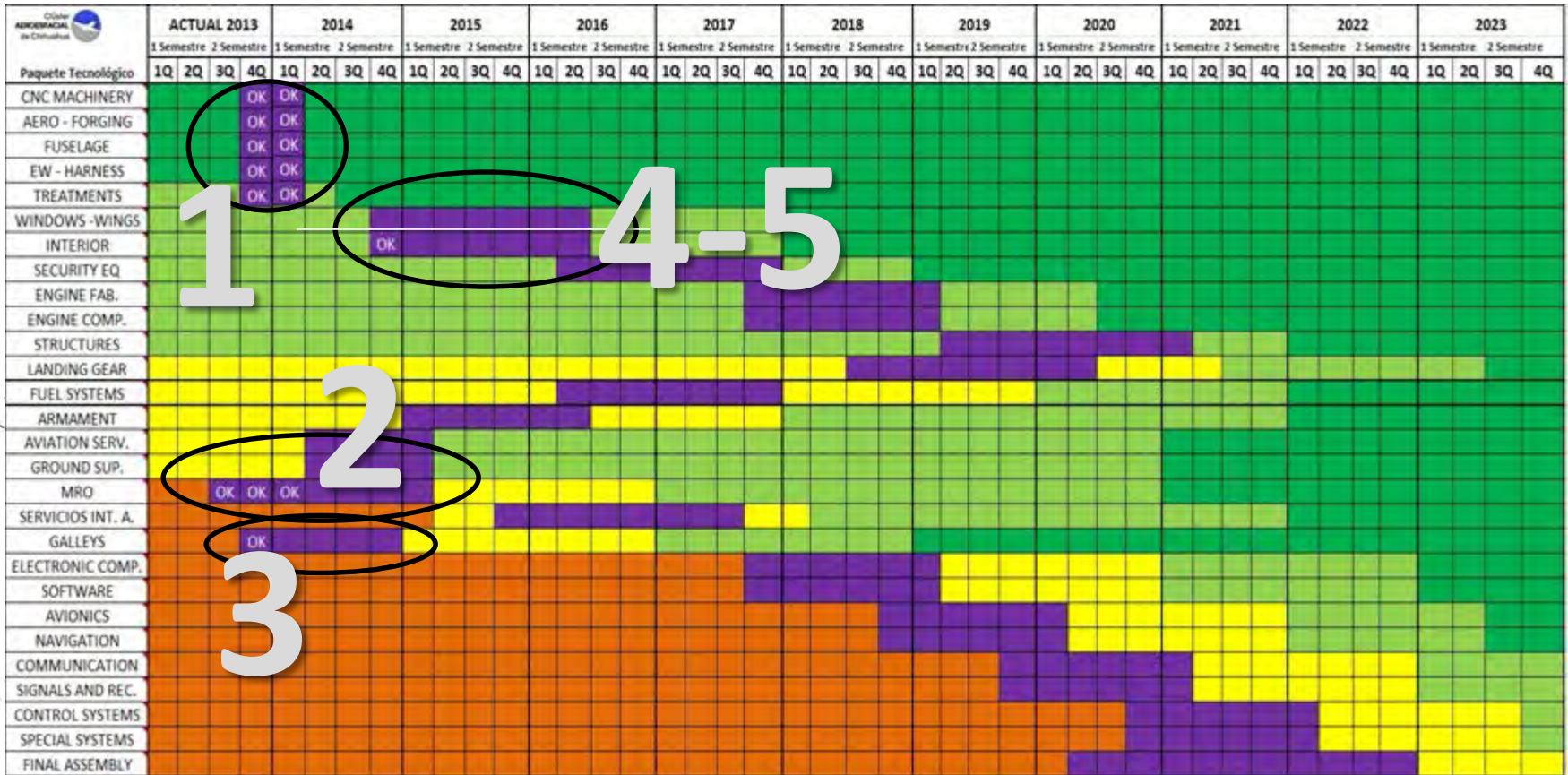
Technological Workshops Results Presentation



Last November was held the presentation of results of the technological workshops, attended by members of the Steering Committee, FEMIA, Federal and State Secretariat of Economy, President and Director of Index Chihuahua, ProMéxico, DESEC, local investors, representatives of the Academy, CENALTEC, special guests and participants of the workshops.



Technological Road Map 2014





Aerospace Industry in Chihuahua 2013-2014



Define the technological capacity currently established in Chihuahua and what is being targeted short term.

Define a Road Map Support of Universities of Wichita and / or Toulouse and External Consultants to define the action plan for 2023.

Virtual Representation of Road Map in stages.

Stage 1

Stage 2

Stage 3

June - August

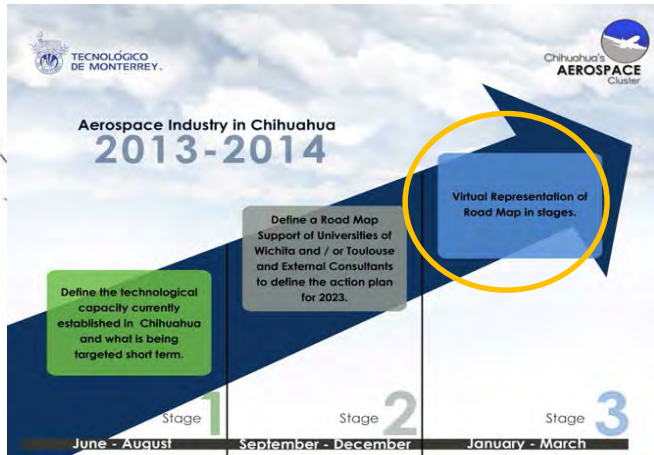
September - December

January - March

Stage 3 Technology



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1

Virtual Representation

Champion: JL Rodríguez
Leader: Mónica Vega
Support Team:
Martín Flores
Tec de Monterrey - Students

2

Cabin Showroom

Champion: JL Rodríguez
Leader: Jacobo Mesta
Support Team:
Aerospace Companies
Tec de Monterrey

3

Airplane for exhibition

Champion: JL Rodríguez
Leader: Martín Flores
Support Team:
Cenaltec
Mónica Vega Clúster
Mechanical Engineers

4

Aerospace Integration Forum

Champion: JL Rodríguez
Leader: Mónica Vega
Support Team:
Aerospace Companies
Government - ProMéxico
Soft Landing and Start-Up
Facilitators



Stage 3



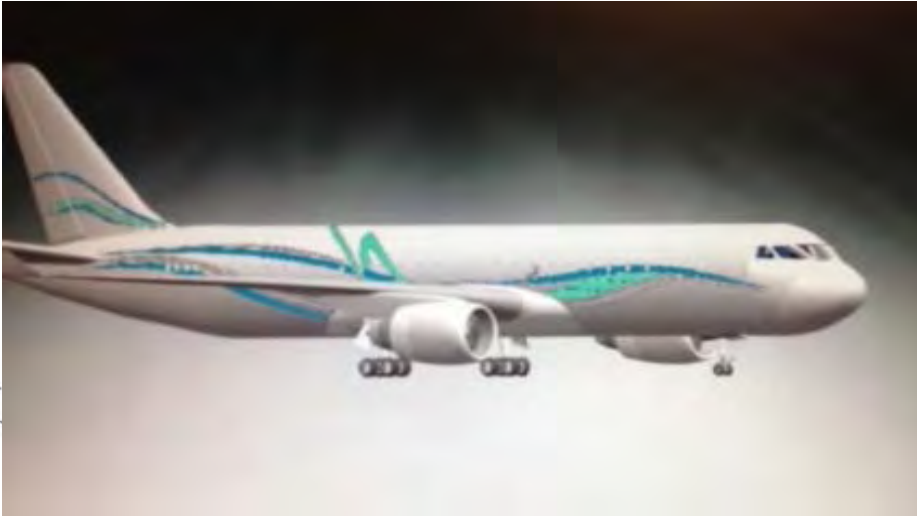
index
Chihuahua
30 aniversario

Chihuahua's
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Cluster



1

Virtual Representation



Produced By:



Tecnológico
de Monterrey

- Elina Sánchez
- Erick Axel Lamas
- Luis Alberto Corral
- Moisés Armando Cruz
- Sarahí Anguiano

Champion: JL Rodríguez

Leader: Martín Flores - CAAMEX

Mónica Vega – Cluster

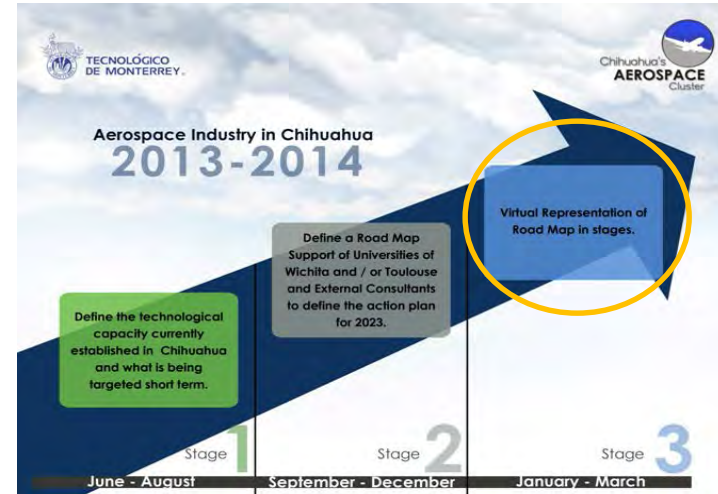
Special Thanks to:

- Levi Talamantes - MFCo.
- Octavio Chacón - Z W&WS.

Stage 3



2 Cabin Showroom



Champion: JL Rodríguez
Leader: Jacobo Mesta
Mónica Vega Clúster
Aerospace Companies



Stage 3



3 Airplane for exhibition



Airplane: Piper Cherokee

Champion: JL Rodríguez

Leader: CAAMEX

Mónica Vega Clúster

Aerospace Companies





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AEROSPACE INTEGRATION Forum Chihuahua 2014





Monday September 29th - Tuesday September 30th

Academia Integration

In order to share the vision of growth of the aerospace industry and develop synergy with the academy, we are organizing a series of speaking engagements and panels that will give the students and professors the opportunity to interact with general managers from aerospace companies established in the region.

Monday 29

1

08:30 a.m.



2

11:30 a.m.



3

04:00 p.m.



Tuesday 30

4

08:30 a.m.



5

12:00 p.m.



6

05:30 p.m.



Activities

- Integration with the Academia
- Integration with the Industry
- B2Bs – Supply Chain
- Conferences
- Lunch
- Aerospace Exhibition
- Videos
- Industrial Tours
- Airplanes Exhibition



Saturday October 4th

Airplanes Exhibition - Base Aérea



Pilatus PC-7



T - 6c



TC - 1000



Cessna 182 Sky Lane

• Thank you! ...



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**Looking for aerospace
opportunities? Go to:**

www.AerospaceClusterChihuahua.com

● Videos

- <https://www.youtube.com/watch?v=ZMy6BoUu0g#t=295>
- <https://www.youtube.com/watch?v=eDnBM05fbVA>
- <https://www.youtube.com/watch?v=wXdhaMfYNOo>



Chihuahua's AEROSPACE Cluster



**Luis Mauricio A
American Industries**

**Mónica Vega Ocaranza
Cluster Manager**

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