

Interview with Vice Admiral Raymundo Morales Ángeles¹
Director General of the Interoceanic Corridor of the Isthmus of
Tehuantepec (CIIT by its acronym in Spanish)
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Stenographic Version²

Interoceanic Corridor of the Isthmus of Tehuantepec (CIIT)

Sections of the Interview:

- Historical Significance
- Maritime Transport and Trade
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- Types of Investment and Contribution to GDP
- Energy and Environment
- Migration
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- 1 Vice Admiral Raymundo Pedro Morales Ángeles was born on July 4, 1966, in the City of San Ildefonso, Sola de Vega, Oaxaca. He is a Naval Sciences Engineer graduated with honors. His academic background includes studies at national and foreign institutions. He pursued Master's degrees in National Security and Naval Administration. He completed diplomas in Telematic Technologies and Information Security. He has received various decorations, published works, and delivered conferences. Since February 2018, he served as the Director of the Naval Higher Studies Center (CESNAV) of the Navy Secretariat. In early 2023, he was appointed as the Director General of the Interoceanic Corridor of the Isthmus of Tehuantepec at the federal level.
- 2 The following interview is an activity of the Research Project titled: "Interoceanic Corridor of the Isthmus of Tehuantepec: A Perspective from International Security Studies and Comparative Politics", registered at the Isidro Fabela Institute of International Studies, Universidad del Mar, with Programmatic Unit Key 21EI2303, approved on July 11, 2023. The author appreciates the suggested and complementary questions from Noemí López Santiago, Teresa E. E. Hayna de Lozanne, Pedro González Olvera, Lizbeth Peñaloza Velasco, Isaac González García, Lucero de Jesús Ruíz Guzmán, Carlos Argüelles Arredondo, Indra Labardini Fragoso, Mayra Lizbeth Argüelles Herrera, and María del Rosario Enríquez Rosado. Likewise, gratitude is extended to Isaac Flores Delgado and Josué Abimael Reyes Rosales for their assistance in the preparation of the stenographic version.

Dr. Alberto Lozano (AL): Vice Admiral Raymundo Morales Ángeles, Director General of the Interoceanic Corridor of the Isthmus of Tehuantepec, on behalf of the Universidad del Mar, the *Isidro Fabela* Institute of International Studies, and the Mexican Yearbook of Global Affairs, we thank you very much for granting us your time and this interview that we will share among the academic, national, and international community. Thank you very much for receiving us.

Vice Admiral Raymundo Morales Ángeles (RMA): Thank you all very much.

Historical Significance

AL: The first question relates to understanding the historical symbolism of the Corridor, beyond the emphasis on the economy: Taking into account that the logistical importance of the territorial narrowness of the Isthmus of Tehuantepec could be documented at least 500 years ago —with Hernán Cortés—; that it played a geopolitical role in the 19th century; and that it has been considered by various contemporary government administrations: How would you describe the relevance or historical significance of the Interoceanic Corridor of the Isthmus of Tehuantepec for present-day Mexico?

RMA: Well, in terms of history, we can indeed think that, yes, starting from Hernán Cortés, but later on, during the colonial period, the Isthmus of Tehuantepec was envisioned as the link between the two oceans, the Atlantic and the Pacific, in order to bring the Pacific closer to Europe in a more practical way by crossing this narrow zone. Then comes Humboldt, who conducts a very comprehensive analysis of all the Mexican coasts and encourages the great empires to seek out the Isthmus of Tehuantepec. From there, during the time of Juárez, we have the signing of the McLane-Ocampo Treaty, where the United States sought to have unrestricted passage through the Isthmus of Tehuantepec, a sort of Panama Canal within Mexican territory. Political reasons of the time led President Juárez to accept that situation, which the United States government itself, through its Senate, did not accept, and fortunately, today we are working on it. We are a country that is not divided into two territories by a canal or by a space that is not under the control of the Mexican government. That is what gives the Isthmus of Tehuantepec its importance in terms of National Security and as a strategic area, which the President has established should be under the jurisdiction of the Secretariat of the Navy due to National Security concerns, as it is not advisable to leave such an important space - strategically and geopolitically - adrift, in the hands of anyone who does not see it as a space of National Security.

So, we believe that the Isthmus of Tehuantepec will allow for regional development, but it will also have an impact on international geopolitics, putting Mexico at the heart of the world.

AL: Is it important to tell people that there is a historical dimension to the Corridor?

RMA: Of course, as I was saying, the Corridor originates from the colonial era, but during the subsequent Mexican governments—specifically under President Juárez and President Porfirio Díaz—the construction of the railroad route in the Isthmus of Tehuantepec was consolidated, because it was sought after. It could be possible to build a canal using the hydrological basins throughout the Isthmus of Tehuantepec, mainly the tributaries of the Coatzacoalcos River, but there is a space that would greatly complicate that maritime connection, which is what we now know as *The Rabbit Ears*, the part of the mountain range that divides the Atlantic. It was very difficult to overcome that part. So, at that time, the idea was to create a railroad line, connect it via the railroad, and development began around the 1840s. Construction started in that area; it was very challenging. The area was very brackish; the weather was very complicated; there was little development; so it wasn't achieved easily.

The Tehuantepec Isthmus Railroad, as such, was inaugurated by President Porfirio Díaz in 1907, but before that, a journey was made around 1894-95. A journey of 10.5-10.6 hours was made, by train between Salina Cruz and Coatzacoalcos, but even so, the tracks were not operational. It was very complicated. It wasn't until 1907 because President Díaz, in a way to counterbalance American power, leaned towards the English and granted this concession to Pearson. Pearson was also a partner of *El Águila* company. Pearson developed the large drainage system of Mexico City, built the port of Salina Cruz, and built the port of Coatzacoalcos. So, he was the right person to do this, and he managed to exploit it, achieving the movement of very important cargoes through the Isthmus of Tehuantepec, to the extent that significant ships were moved. More than 90 ships docked in Salina Cruz within a year.

Currently, we don't reach that level. I mean, the cargo movement during that time was very significant. When the Panama Canal process began around 1914-1915, first with the French, then with the Americans, there was a halt in the development process of the Tehuantepec Isthmus. Why? Because the Panama Canal offered many advantages by allowing ships to cross directly. There was no need to unload them, no need for multimodal transportation. Ships headed towards the Panama Canal, and the Isthmus lost its importance in transporting cargo from one ocean to another. However, when we study the history of the Interoceanic Corridor, of this coastal strip that gives the country that geostrategic advantage, bringing these historical lessons to today will help us understand where we should project this great project. Just To give an example, Panama is currently facing water problems. Lake Gatun is drying up, there is a significant decrease in the water level, and apart from this, there is a problem with water salinity. The process of crossing a ship from the Atlantic to the Pacific is through locks, so seawater from one ocean is

pumped up to the other, and these locks contaminate Lake Gatun with saltwater, causing a problem with drinking water in that region because it is becoming saline. This cannot be permanent, so they will have to consider some mitigation measures. However, this is an advantage for us. Now we have to ensure that this cargo comes to Mexico and use this Corridor that will allow us to relive the history of 1907.

Maritime Transport and Commerce

AL: By the way, regarding the Panama Canal, it has been clarified that the Interoceanic Corridor will not replace the Panama Canal, but it could represent a real competitive alternative. Since comparisons can sometimes be too lax, what would be the appropriate way to compare the Interoceanic Corridor with the Panama Canal?

RMA: Well, first of all, I would say that they shouldn't be compared...

AL: They shouldn't be compared.

RMA: ...So, they're two different contexts. The Panama Canal has a flow of ships through a waterway, and that's something we don't have. The Panama Canal also has an interoceanic railway, double-tracked, and an eight-lane highway. So, they have the same as us in terms of railway and roadway infrastructure, but they also have water. These are not identical projects; they are two different things. Are we competitive? Yes, we are competitive. We are, as we've said, complementary to the Panama Canal. We will relieve the needs of maritime transport from Salina Cruz to Coatzacoalcos and vice versa, alleviating the cargo that currently waits up to 15 days to cross through Panama.

So, what are we doing? We are providing an alternative service. That means the ships that are stuck in Panama for 15 days in order to pass through with their merchandise or end up docking to unload it and transport it by land, we are giving them an alternative. What are the advantages? Very important advantages. We have proximity: we save practically between five and eight days of transit—that means a lot of fuel savings—but also waiting time. If they decide to unload, well, it's the same as us; they also have to unload here. Our crossing is similar; we will transit directly for six hours between Salina Cruz and Coatzacoalcos. The total time it will take us to put a container from Salina Cruz in Coatzacoalcos, let's say the first container will take between nine and ten hours, and subsequent ones every hour.

Why is this? Well, because there are maneuvers that need to be done. I mean, we don't bring in a ferry, we bring in containerized cargo on a container ship. In that case, we have to bring it, unload it, and the most efficient cranes in the world right now are handling around 70 containers per hour. It would be about two or three cranes, the number of

cranes we have in the port will determine the unloading speed. We load the train, we have to take that cargo to a large yard to consolidate a long train because it's not worthwhile to move cargo on a short train according to the topography and the conditions of the track layout. We are going to move around 65 cars per train, so we are talking about 260 containers, double stacked. What does this mean? It means consolidation. The wagons leave the port for the Pearson yard in the case of Salina Cruz, we consolidate, we make the "*iron worm*"—as my fellow citizens from the Isthmus of Tehuantepec would say—and we're going to pull them already consolidated with one, two, or three locomotives, depending on the weight we have. It will take us an hour to an hour and a half to complete the loading process.

AL: It's very efficient, isn't it?

RMA: It's very efficient, but still, it's time-consuming. Two hours, right? So, if I have a direct transfer of five or six hours, plus the two hours I already have, well, that's already eight. When I arrive on the other side, it's faster, just unload and load the other ship, and it takes less time. So, we calculate that a container leaving Salina Cruz, placed in Coatzacoalcos on another ship, will take us between nine and ten hours.

But what happens after we achieve the first one? Then comes **The Carousel**. It's a carousel because the port's logistics organization is designed in such a way that it operates like a carousel. So, being a carousel, we can think that the next train will depart an hour later, and so we can get out a railroad every hour. That's how we're going to be competitive. If we don't have proper logistics or a suitable transportation train, then we're not competitive. We have to beat a ship. Our target cargo is for vessels carrying between 2,000 and 3,000 containers, which are ships with a weight between 35,000 and 45,000 tons. At the moment, we are not considering Post-Panamax or Panamax ships, which would be vessels carrying 9,000-12,000 containers. We are talking about medium-sized ships with 2,000-3,000 containers. Why? Because our vision for cargo movement is not based on unrealistic expectations; it's an objective vision.

We have the idea that initially, we will move around 40,000 containers, starting in 2024, considering that we currently move 2,000 containers in Salina Cruz each year and that Coatzacoalcos handles 20,000 containers, but they are not interoceanic. We estimate that by 2024, with a favorable forecast, we will reach around 40,000 containers per year.

AL: Being objective.

RMA: Let's be objective, let's be realistic, because we can't lie to people. In Manzanillo, we move almost 4 million containers a year. It's a world of differences, but we are making the

Isthmus come alive again. I could tell you right now, “well, in a year we are going to move a million containers,” but that’s not true. We have studied this issue in such a way that we don’t build castles in the air and we estimate that by year 4 we’ll be handling around 300,000 containers per year, speaking of normal conditions, assuming that conditions remain the same.

If the Panama Canal continues to decrease its water levels in Gatun Lake or continues to have problems with saline contamination in the lake and starts to have environmental problems, they will have to reduce... Look, at this moment, the Panama Canal, its rainfall levels in 2023 decreased by 50%. Gatun Lake has historical lows and in recent years, from 2015 to 2019, it had the 5th driest year in the last 72 years. Daily, approximately 36 ships cross the Panama Canal, today 32 are crossing. These are four ships, four ships are a lot because they are New Panamax, Trans Panamax ships, which carry 12,000 containers. So, we are talking about 48,000 containers not passing through at the moment. Up to 90 ships can be anchored waiting to pass. That is our market: the ships that are anchored waiting to pass, because the others pass, but the ones that are waiting, those are our target.

AL: Is it a coincidence that while the Trans-isthmian project is consolidating here, there’s this kind of crisis happening in Panama? Is it a coincidence?

RMA: It’s not so much a coincidence, it’s a consequence. The Trans-isthmian project has been studied for many years, it was clear that the Panama Canal wouldn’t be sufficient. So, Mexico has always bet on the Trans-isthmian project. President López Portillo created this interoceanic service, which later disappeared with Ferrocarriles Nacionales de México for other reasons. President Fox and President Calderón tried to implement the Plan Puebla-Panama, and later President Peña focused more on the social aspect through the Special Economic Zones, but that vision was there all that time, because it was known that this would happen. Nicaragua started to build a canal a few years ago; the Chinese are still interested in joining the project. Building a canal isn’t easy and it takes many years, but there’s the vision that the Panama Canal wouldn’t be enough.

Panama moves around 6% of international cargo, the amount of cargo moving there between the Panama Canal and the Suez Canal is exaggerated. Very little cargo will pass through the Strait of Magellan to go from the Atlantic to the Pacific and to the South Atlantic. It’s very difficult at this moment to define what will happen with the thawing in the Arctic, which could be another route, but at this moment, that route doesn’t exist yet. So, we are here to seize these opportunities.

AL: Fantastic.

AL: With connections to and from Asia, Europe, South America, and the United States, the Corridor is going to be a significant driver of commercial globalization processes. As a maritime expert: What impact do you foresee for maritime transportation and trade? Could we further develop our maritime and commercial transport?

RMA: This is incredibly interesting. In Salina Cruz, we have two ports: the current port, with a depth of 14 meters, where we will have a container service that we will use for multiple purposes because we have a capacity of up to 300,000 TEUs³ annually, but it could grow; this is the old port. However, we are building a new port, the former oil port, where we are developing a breakwater of 1,600 meters in length, which may sound easy, but we're talking about 7 million tons of stone. That port will allow us to have access to a depth of 24 meters, making it the deepest port in Latin America. I'm not sure if there's one in the United States, but at least in Latin America, there isn't one with a depth of 24 meters. In other words, there's no limit for ships there. So, let's not just think about interoceanic traffic or transit; let's think about Salina Cruz becoming a port hub...

AL: Continental?

RMA: ...Continental. But we have Manzanillo and we have Lázaro Cárdenas. Manzanillo is about to reach its limit. It's going to reach a limit of 8 million containers, and Lázaro Cárdenas is going to absorb part of that load, but then Salina Cruz will be a relief for them. So, the movement of maritime cargo has to be revitalized; it will be revitalized in a natural way. And what will grow? Well, national coastal shipping is going to grow, and we're going to grow with themes related to the famous "feeders," which are short-distance navigation routes. This is because loads, for example from Ecuador, Colombia, Guatemala, and all those areas, are often better served by being routed through Salina Cruz. Why? Because let's remember that container ships carry 12,000 containers. The largest containers, but not all of them go to Europe or the United States. Many come to Mexico; many stay in Central and South America. So, we'll see that many smaller ships will need to move their cargo along these coastlines. Therefore, we definitely can't think about the future of maritime transportation without considering the Interoceanic Corridor or the Isthmus of Tehuantepec.

AL: Specifically, what geographic factors, both on the coast and inland, would be an advantage for the operation of the Interoceanic Corridor, and how would these advantages foster the development and promotion of global value chains, both in the land and maritime sectors?

3 It's the acronym for Twenty-Foot Equivalent Unit and is the measurement unit for the most popular type of container (in feet). It's used to measure the size and capacity of ships as well as to calculate port activity.

RMA: Well, first, the narrowness. It's 220-230 kilometers as the crow flies, by rail it's 308 following some curves, by road it's more or less the same. That's an advantage in itself. Another geographical advantage is the position of Salina Cruz, the new port we have, that we're building, and that this port can expand all the way to Punta Conejo. In other words, it can be as big as we want it to be. This connects us with the entire national road system through the highway being built from Tehuantepec to Oaxaca City and the highways leading to Veracruz. But geographically our region has very important characteristics for the development of... talking about the topic of logistics, you were saying, right?

AL: Yes.

RMA: ...in logistical terms, well, narrowness is the most important feature. With regards to the capacity of the railway, we have the possibility, at some point if necessary, to create a second track, a double track, which is not necessary at the moment as the demand for cargo isn't...

AL: Oh, isn't a second track necessary?

RMA: It's not necessary, and let me explain why right now; but at the moment, a double track isn't necessary. Having a double track would be redundant, but there will come a time when we will need a second track.

AL: Hopefully.

RMA: I'm sure it will become necessary, but at the moment, it's not. However, it's important to understand that the port of Coatzacoalcos, due to its geographical position, is closely connected to the East Coast of the United States, and it's also a route to the Caribbean and Central and South America.

So, Coatzacoalcos is a gateway to the existing routes. Not directly to Europe, but it serves the East Coast of the United States and the Caribbean. Coatzacoalcos will boost cargo traffic on the Atlantic side, while Salina Cruz will do so on the Pacific side. So, geographically, the size of our coasts makes this very efficient. Additionally, we have complements; on the Pacific side, we have the complement of Puerto Chiapas. In times when the port of Salina Cruz might face limitations due to weather conditions, we have the option of using the route to Puerto Chiapas. Currently, we are making efforts to ensure that Puerto Chiapas never faces sedimentation issues again. On the other side of Coatzacoalcos, we have the outlet of goods from Veracruz and Altamira, as well as the probable development of a port in (the city of) Frontera, Tabasco. All of these conditions will allow us to attract cargo here.

AL: Vice Admiral Morales, it is said regrettably that “Mexico turns its back on the sea”, that even though Mexico is a country with 17 federative entities that border the coast, we do not fully utilize the sea. There isn’t a maritime culture among the population. At Universidad del Mar, apparently, we are the only university where Maritime Law is a mandatory subject, while in the rest of the country, it tends to be only an elective at best. Will the Interoceanic Corridor of the Isthmus of Tehuantepec increase our maritime culture in Mexico?

RMA: I believe it can. We are working on a project to better integrate ourselves with all the ports of the National Port System, but international maritime culture is, I think, a much broader issue that we should address at a... regardless of production chains and logistical issues, we need to work on it as a more cultural issue, and we need a stronger effort so that people see the sea as more than just a beach destination, but also as a source of wealth and livelihood.

But it has to be that way. Mexico is a very rich country—and I have said it in some forums—being a country rich in land, people don’t seek the sea for wealth because they have it easy on land. So, countries that have developed towards the sea have done so because they have little wealth on land and so they go where the wealth is. I am sure that little by little our countries have been advancing in maritime culture. We have made a great effort for this to happen and it will continue to progress as we have better opportunities.

Maritime and Land Logistics Optimization

AL: These questions come from our Institute of Actuarial Science and Mathematics, and they specifically relate to logistics optimization: What methodology was used for the decision regarding the layout of the Corridor and the location of passenger stations and the ten industrial parks?

RMA: Well, the layout was done by Porfirio Díaz, it’s the same layout, we didn’t change it, and we didn’t change it for a social reason and a historical reason. Changing the layout meant acquiring right-of-way—which we don’t have—and taking away from the communities their railway vocation. So, the layout is efficient, except for two sections: the section between Chivela and La Mata, which is the crossing of the mountain range, where we have to cross the mountain range with very steep curves, 11° curves and a 2.4° slope that makes that area very complex. It’s an area where to change that layout we would need a lot of resources to build a tunnel and do things in the mountains. For now, we’ll leave it the same. The other very complex area is the Malatengo River area, in the municipality of San Juan Guichicovi, where we go along the hillside and the river side, and I believe that later on, we will have to make some significant investments so that those curves are softened and we have greater efficiency in the movement of cargo.

But basically, the layout is the original one; we didn't change it for historical and practical reasons: the right of way. Now, the location of the stations as well. The solutions were already there. What did we do? We conducted a demand study, a demand study based on old statistics, the previous and current movement of passenger traffic by train and the current movement of passengers using various modes of transportation that would eventually switch to the railroad because it's cheaper and more comfortable. We have an interesting demand at the moment of 3,000 passengers daily on different sections, short sections, and as a result, we identified which stations to repair because there were many stations. In every little town, there was a station.

At the moment, we are only going to restore some stations: the Salina Cruz terminal is already repaired; we are going to build a terminal in Coatzacoalcos, we are building a medium-demand terminal in Ixtepec, one in Matías Romero, and the others will be stops. We will establish a stop in Chivela (Asunción Ixtaltepec), a stop in Lagunas (El Barrio de la Soledad), a stop in Mogoñe (San Juan Guichicovi), another stop in Medias Aguas (Sayula de Alemán), Jáltipan... and we will make more stops as the demand grows. The stops change the concept of the old railway station. We use the same facilities because they are historical, but the concept is more automated; it's an open platform where people have better communication among themselves. It's about promoting formal commerce around the stations and avoiding street vending, which besides being dangerous due to the railway issue, is disorderly.

So, we're going to support the communities so that they can be "the owners" of these spaces, not "owners", but rather they will be the users and the communities can coexist with the train stations. But basically, it was the demand study on passenger issues. There are other logistical issues that you're not asking about, but I'll tell you. There are some elements that are the maneuvering yards, the sidings, the escapes—mainly in terms of cargo—and the supply centers, workshops, all of this. So, all of this is based again on the demand study. We cannot simply install infrastructure somewhere on a hunch.

So, we have a yard, the Pearson [multimodal] Yard in Tehuantepec. Regardless of the port yards, we will have another yard in Ixtepec, which was already there. That yard doesn't have much demand because there isn't much industry, but it's the interconnection with the line that goes to Chiapas. It's necessary. We have the Matías Romero yard: the Matías Romero yard has the advantage that we have a Development Pole nearby in Donají, but it's also the essential yard because we will have workshops and the Unique Dispatch Center there.

So, we're going to restore Matías Romero to being "The Railroad City"—it even says "Railroad City" at the entrance—well, now it's going to be "Railroad City" again. Unfortunately, yesterday we had a 40-hectare plot that was reduced to 14-15 hectares because it was invaded, but with the current urban conditions, we can establish some good workshops; we're going to set up a training school there in Matías Romero, and a Dispatch

Center with all the capacity to control the entire train.

We are going to have another yard in Medias Aguas. The same case applies; it's an exchange yard that connects with the route heading towards the central part of the country and the terminal yard of Coatzacoalcos.

We have a small yard in Hibueras, in Minatitlán, to interconnect the industrial area and a series of sidings - currently seven sidings, which might become nine - serving several purposes: the sidings help avoid a double track; they enable trains to run simultaneously on the track, on a single one, so that when a train is coming—that's why we have a dispatch center—the traffic is controlled. The train leaves, and when this train is reaching the end of the siding, the other train is also arriving and goes out onto the siding. One of the two goes out onto the siding, but when the one coming down the siding re-enters the main track, the other one has already left.

Currently, we are constructing sidings that are 1,800 meters long for 65-car trains, but the sidings can expand depending on the amount of cargo capacity we bring in. How many sidings are we going to build? As many as the cargo demands. At the moment, seven are sufficient. We will expand to nine. If there continues to be more demand for cargo, we will add ten, twelve, fifteen, twenty... and gradually we will build according to the tracks, putting in the first sidings. When will we need the second track? Well, when we have more than 30 simultaneous trains.

AL: Who sets the demand? Is it the global market?

RMA: The demand for passengers in the regional area. The demand for cargo; we have two sources of cargo: interoceanic cargo and regional cargo. Today, we have calculated an immediate average of 1 million tons of regional cargo, and probably in the coming years, we will reach one and a half million tons of regional cargo, plus interoceanic cargo, which is mainly containerized. So, all of that is the demand. That's how it's calculated.

AL: Regarding risks of various types such as operational, natural, or environmental. Are there analyses and coverage for such risks?

RMA: In the railway sector, by law, the Regulatory Law of the Railway Service requires having insurance for both operation and the track system. A derailment must be covered by insurance and operational issues. But if a hurricane (or a collision) destroys a bridge, or washes away the embankment, it's covered by insurance. But, in addition to this, we have to consider that we repair this track. In other words, it's a track that was destroyed, abandoned, where every year the rains washed away the bridges. So, drainage works and hydraulic works are carried out to effectively drain these large watercourses to prevent flooding.

Types of Investment and Contribution to GDP

AL: The Mexican Isthmus, as a geographical space, has been interpreted through three modalities: **the line** (connecting both oceans through railway, highway, or canal); **the points** (strategic nodes represented by ports), and **the internal space** or region (internal dynamics within the territory): As a national investment megaproject, is it correct to interpret the Interoceanic Corridor from a holistic regional vision that considers all three modalities simultaneously?

RMA: I completely agree. It should be a holistic interpretation. But beyond those three elements you mention, I believe we should emphasize the issue of the Corridor's purpose. Its main objective is the regional development of the Isthmus of Tehuantepec and the improvement of the quality of life for the people of the Isthmus of Tehuantepec and its area of influence up to Chiapas and Tabasco.

To achieve this, we are implementing this logistics platform. This logistics platform will allow this to happen through certain planning elements, management, and making things happen. But above all, there is an important cultural aspect in the Isthmus of Tehuantepec, and we must respect that inter-culturality. We cannot bring development by destroying culture because that would be criminal.

So, how should we view the development of the Isthmus of Tehuantepec? We should see it as a multimodal logistics platform, which is what you just mentioned: the train routes, the roads, the ports. That's the part of the intermodal logistics platform. Additionally, we think about the Development Poles for Well-being that will generate well-paid jobs and, moreover, will bring certain development characteristics. But beware, an industrial corridor, in many cases, brings poorly paid jobs and belts of poverty around it. We have to avoid that, and also, we must not allow the Corridor to result in increased crime, depletion of water, or mismanagement of waste, both garbage and other types of waste.

So, all of this needs to be taken care of; that's why the vision has to be—as you mentioned—clearly holistic, but holistic in its fullest sense, with all elements of the system seen not as a linear matter but as a dynamic issue that allows understanding how a Development Pole energizes the cargo but also affects the population around and has impacts on ecology as well. So, how to mitigate, how to make all these ecosystems coexist? That is the holistic vision.

AL: What type of investment is expected to come to the Corridor? Does near shoring already have any influence?

RMA: It is influencing. We have ten Development Poles, and we are going to have two more

in Chiapas, probably one more in Veracruz, and the Poles will grow a little. Right now, we are bidding for five poles with different productive vocations. The productive vocations that we are expecting, due to near shoring, which I am sure will come, are basically related to value-added topics. In other words, we don't want cheap manufacturing—we'll give it a chance, but—we wouldn't want people to come to the development of a Pole, a classic industrial park, where they come to sell lots, because that doesn't bring us anything. We are avoiding speculation. How are we bidding for these poles? We are granting a very short concession of two years to ensure that the investor reaches a critical investment level where it becomes more expensive to withdraw than to continue, and that way, they won't speculate.

What are the vocations? Electrical and electronic, semiconductors, automotive environment, auto parts, medical devices, pharmaceuticals, agro-industry and energy, metals, petrochemicals. As you can see, there are no logistics; we don't want warehouses. We know that warehouses will come, but we can't provide them with tax incentives and all the facilities to set up warehouses because how many jobs does a warehouse generate, and of what quality? If there are going to be warehouses, then let them rent from people who own the land. This way, we will achieve quality jobs. One of the requirements we have in our bidding criteria is that companies offer the employment base, and the employment base is essential because by law, I can demand a minimum wage, but if you come with a company telling me you're going to pay the minimum wage, then you're not competitive. Specify: how many minimum wages is your base, and what is your average salary because there is no better way to develop the region than with good wages.

And then comes the other problem: human capital. Where do we get the human capital? And there we have a problem because we know that education in the Isthmus is limited at the moment. Well, then we tell the company: "Present me a proposal, how are you going to interact with the educational system in the region to generate human capital, so that you don't tell me you're not hiring local people because they're not prepared. Prepare them. Also, it's not fair if you have an enclave—as people from Jalisco would say—where your industrial pole is beautiful, with nice cement streets, beautiful houses, and everything is nice, and around there are little towns that don't have drinking water, no sewage, nothing. So, what do you offer to the small towns? How many projects of at least 5 million pesos each project do you offer to your area of influence in terms of urban improvement? And urban improvement that you're not going to impose what you want, but the urban improvement that the community will choose and that the community will develop. So that the company doesn't come and say, "I already made them a traffic circle." I'm not interested in a traffic circle. What do people need? That the people decide what they want to do and that they lead the development of their communities. So, we are handling it more or less like that.

AL: Another comprehensive vision as well. Are there any countries that you could highlight as interested investors?

RMA: We have Germans, we have many Europeans, many Mexicans, and we have the United States, mainly.

AL: Is China interested?

RMA: You know, not so much. The Chinese are very focused on the central part of the country. Not many have arrived. There were, I believe, one or two companies interested in a Development Pole, and most likely they will come.

AL: On the side of Oaxaca or on the side of Veracruz?

RMA: From Veracruz. But we still don't know exactly who will be involved.

AL: Have you identified the potential, opportunities, or issues in the primary sector of the economy in the municipalities of Oaxaca or Veracruz involved in the CIIT? For example, the utilization of agricultural, livestock, fishing, or forestry resources.

RMA: Yes. We have a program to develop the Isthmus of Tehuantepec, and within this, we have the agro-industrial part. We also have community tourism — another aspect of the Corridor. In other words, the Corridor is what we mentioned: it's the platform, but we also have an internal part: the Program for the Development of the Isthmus of Tehuantepec, which seeks to incorporate the population into productive chains. We have some examples: a **sesame seed** pilot program was recently developed with very good results, we are introducing salt to enhance its productive level. Recently, we met with the mayor of San Francisco del Mar; they intend to establish **pig farms** with a capital of 5 million pesos. In coordination with the government of the state of Oaxaca, it is possible that they can multiply it by ten. So, we have a topic, we did the **sesame seed** program in Mixtequilla. We are working with livestock farmers to address silvo-pastoral issues. We are exploring the possibility of establishing a **FIT** (Federal Inspection Type) slaughterhouse, and we are looking into **pineapple** cultivation in the Isla region (Veracruz) because the Corridor is more spacious, and we are seeking an approach with the municipality of San Blas Atempa, which, by the way, does not want us to establish the Development Pole because they don't understand it well. I am waiting for them to give me...

AL: There have been protests.

RMA: ... I'm seeking an approach with them to talk about what I'm sharing with you. I

want them to see that it's not how they are presenting it. Leaders take advantage of the opportunity to tell them things that are not necessarily true. They have a need because they produce **sweet potatoes**, so we aim for that sweet potato production to be part of the Development Pole, and they have their processing, not selling raw materials but rather selling value-added products. There was the possibility of setting up factories to utilize everything related to **mangos** and the entire Tapanatepec and Chahuities area. Unfortunately, the land offered to us by the municipality of Niltpec does not meet the conditions; we are asking for another one, but if it happens, we will be developing an agro-industrial Development Pole in that area. Also, in Chiapas, towards the port, we have 500 hectares of which 400 will be a Development Pole. Also, agro-industrial themes. There will be two Development Poles there, and in Arriaga, we have another possible agro-industrial Development Pole.

AL: So, will Community Tourism also have a place there?

RMA: We are working on it; it's complex. It's not so quick and not so easy. We are working on it. Veracruz is very easy; the Los Tuxtlas area has everything, but yes, for the Isthmus, we have to figure it out. We have little, little tourism, few options, but we have to generate them. We have **textile** issues, issues with **totopos** (tortilla chips), we have issues with the ruins that go towards Jalapa del Marqués, we have the **Ojo de Agua de Tlacotepec**, and we have the **Río de Los Perros**—which is one of the most contaminated rivers in the country or the world. We registered it in a UN program to see if we could obtain funds for its sanitation, both the Río de Los Perros and the entire lagoon system in the Isthmus of Tehuantepec, and that will help us now with another issue: **fishing; health issues**; we have helped the fishermen, given them boats but within their own system; we are looking into aquaculture; in Chiapas, there are already some approaches with **shrimp farms** from Sinaloa that want to establish themselves here in Chiapas.

AL: I understand that there is an approach from UMAR (la Universidad del Mar) for the study of the lagoon system and the Río de Los Perros.

RMA: Work is being done on that, but the problem is the resources. It is very expensive to clean up a heavily polluted river that passes through many communities, and we are working with the UN to see if they support us in that.

AL: Is there any estimate of how this mega-project will impact the Gross Domestic Product?

RMA: I don't have the exact figure at the moment. I couldn't provide an exact number, but they talk, initially, about one to two percentage points of the GDP with the aim of reaching up to seven percent of the GDP.

Energy and the environment

AL: What is the importance of natural gas with the Jáltipan-Salina Cruz gas pipeline in the CIIT?

RMA: Without gas, there is no industry. I believe that would be the phrase. We have the Jáltipan to Salina Cruz pipeline, it's a 12-inch pipeline — highly criticized, by the way, as “it won't work” — we tried through the Federal Electricity Commission to establish a 36-inch gas pipeline, and there is a lot of opposition from some social groups. So, the decision was made not to do it. Instead, three gas repowering plants will be enhanced: one in Jáltipan, another in Donají, and another in Medias Aguas.

AL: So, no more gas pipeline?

RMA: The gas pipeline remains, the 12-inch one. Currently, the 12-inch gas pipeline has a current capacity of around 20 million cubic meters per year. With this repowering, we will reach 90 million cubic meters. The Salina Cruz refinery at its highest consumption will use around 40-50 million cubic meters, and the Development Poles are consuming around 15, between 11 and 15 million. We are more than covered for growth at the moment. For now, we would be covered for the next ten years, but yes, eventually, we would have to consider a pipeline with higher capacities. But at the moment, we have natural gas.

But there's another issue: wind energy. The Isthmus of Tehuantepec is a wind and sun mine. So, we have to start considering—and I hope it doesn't take long, about three years—that we can have green hydrogen plants, green ammonia from electrolysis, from solar and wind power generation that allows electrolysis, and that electrolysis generates ammonia, and ammonia is used for the steel industry. It wouldn't surprise me if, in a few years, we have a green steel plant that doesn't pollute and instead of burning coal, it burns green ammonia. Ships in the naval industry are moving towards using ammonia instead of diesel. We already have the first train in Canada running on green ammonia. Mercedes Benz has just placed an order with Danish industries, for example, Nordic industries, for all the steel that the automotive industry of Mercedes Benz will use to be from steel plants producing steel from green ammonia.

AL: And are we heading in that direction?

RMA: I believe we have to go there. At the moment, we are just exploring, but I believe clean energy has to move in that direction because we have a mine: we have the air, we have the sun.

AL: Does wind energy currently have a role in the short term for the Corridor?

RMA: In the short term, we won't introduce wind energy there due to social demands, but yes, in the medium term. The problem with wind energy is that it doesn't generate jobs, I mean, wind turbines don't create jobs and have an ecological impact. Even if they say not. Bats, birds, butterflies, all this needs to be studied, it's not just about installing them. So, all these studies need to be done. However, I believe that if we combine them with hydrogen and ammonia, they will solve a significant energy problem internationally.

AL: Is there anything you would like to emphasize regarding the relationship between energy production and environmental impact?

RMA: Well, definitely, we do need to continue promoting clean energies. We have to be realistic, fossil energy is not going to disappear so quickly, and we need to continue using it with better practices. Our trains are going to have low-sulfur content, very economical. We currently have a train that is consuming very little fuel, I mean, trying to make them fuel-efficient and therefore, with low emissions. But it can only be achieved with good practices, such as proper machine maintenance and using low-sulfur fuel; that will allow us to decrease the impact, the environmental footprint of our resources.

Regarding water, for the companies that will establish themselves in the Development Poles, we are asking them to at least reuse water twice, and that the water infiltrated into the subsoil is at least water suitable for human contact. And we are currently working with the state governments on waste management, because here comes another issue, we arrive with large industries and create landfills. We do not intend to create landfills, but rather for everything to be sustainable.

Migration

AL: Considering that the Corridor could become a magnet for migrants—because there will be jobs—with the precedent of what “La Bestia” train represented for large migration flows in past decades, and the very current context of massive waves of migrants from Central and South America and other countries: Is there any strategy being envisioned to prevent the trans-isthmian train, as a means of transportation, from also becoming a renewed form of mobilization for migrants?

RMA: We have a few options for shunting yard confinement, station confinement to prevent the invasion of shunting yards and stations by migrants in a massive way. As for being able to board the train as it was with “La Bestia”, it will be very complicated due to the speed. We are not going at 5 km/h anymore, now we are going at 80 km/h in some parts, 40 km/h in the most difficult areas, 30 km/h, which doesn't make it so easy for people to climb, and above all, these are areas with no access, straight zones from 80 to

70 km/h. It's difficult for someone to climb onto a train at that speed. So, I believe that will inhibit it somewhat, the other reason is confinement. The entire network will have security, both industrial and private security, as well as security from the Navy, which will guarantee us that there is no intervention by criminals.

And on the issue of migrants, well, we will gradually have to develop a support mechanism with the National Institute of Migration so that this does not become a means for them to move. In terms of employment, I think we don't know yet to what extent the government will define what opportunities there will be to provide employment for immigrants.

Geopolitics

AL: Vice Admiral Morales. In the coming years, what do you consider the Interoceanic Corridor of the Isthmus of Tehuantepec will signify in the Mexico-United States relationship?

RMA: Well, I believe the Isthmus of Tehuantepec is going to become the heart of the world. From a geopolitical standpoint, it will be a meeting point for trade movements. In our relationship with the United States, I think it will strengthen because, firstly, we are doing something interesting. The issue of migration to the United States by Mexicans is due to lack of opportunities. By giving people opportunities in their own land—as the President has stated on several occasions—they will migrate by choice, not out of necessity. So, that's an important aspect of the bilateral relationship.

Next is the issue of drug trafficking. By having a permanent presence throughout the Corridor—because the Navy is in charge of this Corridor, from Ciudad Hidalgo, Chiapas, to Ixtepec; from Salina Cruz to Coatzacoalcos; from Coatzacoalcos to Palenque, and beyond the Maya Train, which will be managed by the National Defense Secretariat with the National Guard—it will allow for a significant deployment of security forces in the entire region, which in itself inhibits crime. By inhibiting crime, it will also control drug trafficking, which concerns the United States. And if we develop, we also attract development to Central and South America, which could lead to significant development in the Mesoamerican region and help North America. So, I see it more as an opportunity for both legislations for commercial integration, for stronger cultural integration, given these development dynamics. Sometimes, a rich country benefits from having a poor neighbor, but not too poor. I mean, I think such marked asymmetries lead to issues like migration, crime... so, by reducing this asymmetry, we will achieve better interaction.

AL: This bioceanic essence of the corridor, do you think it can be translated as a means to increase Mexico's capabilities, to increase Mexico's power?

RMA: Of course. The Corridor itself, with or without capabilities, is an area of geopolitical importance, and that's where it becomes a National Security issue. That's why the decree declaring the Corridor as a National Security asset was not challenged and the Court upheld it. I mean, they rejected the decree declaring the works as National Security assets, but they didn't reject the following decree declaring the Interoceanic Corridor itself as a matter of National Security. And they didn't reject it because it is a matter of National Security. Because the importance of the Corridor in the political, economic, social, and military power of the country lies in the fact that it allows us, firstly, to guarantee the integrity of the Union, since if we do not control that space, we can divide the country into two parts. But also, having the proximity of one ocean to another, the movement of troops, the movement of defense capabilities is much more efficient and faster. So, it is definitely an important part of military power.

We've talked a lot about economic power, and social power is the fact of improving the quality of life of those populations that have been neglected for centuries. You will make them feel more Mexican, give them a greater sense of identity as Mexicans, and therefore, they will be a substantial element for any crisis situation in the country.

Security

AL: Being an expert in cyber-security, how does the digital dimension operate in the security of the Interoceanic Corridor of the Isthmus of Tehuantepec?

RMA: Well, there are several aspects to consider here. The first one relates to control, what was formerly known as SCADA⁴ systems, which managed pipelines and electricity. In our case, we have the dispatch control system, and initially, we will have manual hardware and track equipment. We won't automate it because at the moment, we don't have the need for cargo movement on a large scale, so it's not worth making such a significant investment in automation when the number of trains moving isn't that substantial.

However, we do need to focus heavily on cyber-security as we automate all these track equipment systems, switches, escapes, etc. Regarding dispatch, we have redundancy, meaning we have satellite communication to dispatch trains, open track sections, and coordinate various elements along the track.

This could involve a passenger train, a freight train, a maintenance machine, a person doing some work, or even a cow. So, all of this needs to be communicated to the locomotive operator to prevent accidents. For this, we have redundancy in both radio systems—we have at least two radio systems—and satellite systems. We're still constructing the dispatch

⁴ SCADA: (Supervisory Control and Data Acquisition) "It is a key tool in industrial automation. It is a computer system that allows supervising and controlling the operation of remote facilities through the collection, transmission, and analysis of real-time data." Source: Autexopen. 2022. "What is a SCADA system? Complete information." Autexopen.

center. Currently, we have a provisional one in Coatzacoalcos, which isn't very automated yet. When we have the one in Matías Romero, it will be the most automated, and the more automated it is, the more invulnerable it becomes. So, we'll expand as demand requires, and while we can't consider ourselves infallible, I believe we can have enough capacity to mitigate risks.

AL: So, increased digitization doesn't necessarily mean increased cyber vulnerability...

RMA: Definitely not. Increased digitization implies greater security measures because there are other interests in that information, but that's where risk notification systems come in; you mitigate risks to prevent incidents from occurring.

AL: Do you think it would be useful for the CIIT in Mexico to observe the experiences of other crossings in the world that have experienced criminal presence like the Panama Canal (Central America), the Suez Canal (Africa-Asia), the Strait of Malacca (Asia), where criminal presence varies—gangs, mafias, terrorists depending on the geographic area—? Is it worth conducting this comparative analysis?

RMA: Absolutely. In fact, we're conducting some studies to establish the best security mechanism, a security scheme that helps us prevent the presence of criminal groups in the region. Here I would like to be very clear: We are not looking to apprehend criminals because that is not our objective. We want criminals not to arrive.

So, if they leave, even better. It's not about catching them. We're not looking for criminals; our goal is to free the region from criminals. So, many will leave, and others will have to be detained. But, up to now, there have been some. We won't say there aren't any because that would be a lie. There have been some small outbreaks; occasionally, some groups emerge there, more than acting directly, issuing threats to say "we have arrived, we're going to take control." But the presence of NAVY forces means they only announce themselves automatically but never arrive. Up to this point. What do we have to do? We have a strategy in place that we are refining to have a very large presence of naval military forces in the area with technology, drones, equipment of all kinds, especially intelligence, to prevent any issues that may hinder our operation.

AL: Based on calculations we have observed from the Executive Secretariat of the National Public Security System, we have identified some municipalities within the 79 contained in the Corridor experiencing a higher crime rate than the national average. For example, San Miguel Tenango, Matías Romero Avendaño, Chahuities, Acayucan, etc., and some located in the locations of the Welfare Development Poles (PODEBIS, by its acronym in Spanish), among them Santa María Mixtequilla, Coatzacoalcos, Jáltipan. Won't this

be a problem for attracting investment and enhancing the productive capacities of the PODEBIS?

RMA: It could be if we didn't have control. But right now, for example, in Matías Romero, we reinforced the police with personnel from the Navy—Matías Romero got a bit *ugly* a few days ago. Right now, it's under control, and we have to keep acting there. There we have a PODEBI, which is in Donají. More than problems in that area, Mixtequilla, for example, is not a problem of crime. In Mixtequilla, the issue is social. The homicides that have occurred there have been due to struggles between leaders who want to take over the social aspect. We expropriated that land, paid the communal landowners, and the landowners received their compensation—which is practically payment for the land—and there was additional funding, which people want to distribute equally among the 4,000 inhabitants of the community.

Well, that's irrational, it's against the law, and leaders there arrive and want to burn and... but they have the house taken at that moment. It's an issue being resolved by the state government because it's more of a local issue, but yes, there is crime. Where there is more crime is towards the Chahuities area—as you say—but mainly towards Zanatepec, that area of Niltpec, Zanatepec, there is some crime there, but whenever there have been events, we have moved enough force to suppress them. So, our goal is to protect the Corridor. With what? With the Marine Infantry Force, state police, municipal forces, and the National Guard. So far, we haven't had any incidents that we can present as a critical case. Yes, in Matías Romero there were threats against bus passenger transporters, and the situation in the Coatzacoalcos area a few years ago was such that you couldn't even walk at night; nowadays, the boardwalk is bustling.

AL: That's great!

RMA: In the Acayucan area, there isn't as much of a problem; it's a bit more towards the mountains where they've... well, they've moved towards the mountains. So, occasionally, criminal groups position themselves there, but as long as we maintain our presence, we're confident they won't grow. They'll keep coming, they'll arrive, I mean, that's normal. It's impossible, everywhere has them, but it doesn't mean we're not in control.

AL: Oaxaca is one of the six states where poppy cultivation occurs and it's also among the top states for marijuana cultivation. Could this proximity to the Corridor increase demand from organized crime for marijuana plants and opium gum in the area, leading to increased cultivation? Have you anticipated this?

RMA: Poppy isn't produced in that area of Oaxaca; it's produced towards the mountains,

on the other side. There's little poppy production on this side. I think what we do need to consider is drug dealing. We need to work on that issue as new populations arrive, as tensions may rise. The international trend with drugs is moving towards synthetic drugs, unfortunately.

AL: That's right.

RMA: So, we need to be very careful at the ports to prevent the entry of chemical precursors, which is the real Achilles' heel at the moment. I believe poppy and marijuana will have some influence, of course, but I don't think it'll be a significant issue to contend with; we shouldn't neglect it, of course, but I don't think it'll be a major concern.

AL: Specifically, regarding the port of Salina Cruz, the growth it's going to experience will undoubtedly make it an attractive entry point for chemical precursors and drugs from Asia, similar to what happens today with Manzanillo and Lázaro Cárdenas. Do you anticipate an increase in the establishment of clandestine laboratories around the interoceanic train route, considering this new influx of synthetic materials?

RMA: I don't think along the route because we're working on the social aspect, we're working on improving people's quality of life. But I do believe it could become another entry point for clandestine laboratories, and that's where we need to work. Yes, we need to work on that. The entire national maritime customs system is being modernized, and Salina Cruz won't be an exception. We need to implement all the technology necessary to contain this issue.

AL: The same goes for the other side, in Coatzacoalcos, to prevent it from becoming an exit point for drugs destined for the Caribbean and Europe, right?

RMA: That's correct. Two days ago, I believe, there was an announcement from the Secretary of the Navy stating that we've achieved a historic record in drug seizures at sea. I mean, the Navy has intensified its operations, and we've achieved significant records in drug seizures, so we need to prevent drugs from staying in our country. But it's a constant struggle.

AL: I haven't forgotten that in 2008, The Navy captured a semi-submersible coming from South America to the United States off the coast of Puerto Escondido and they had it detained at the Naval Base in Huatulco.

RMA: So far this year, we've seized three, near the coast of Michoacán.

AL: Which pass through Chiapas and Oaxaca.

RMA: Yes, these come from South America. The thing is, they're very difficult to detect.

AL: That's right.

RMA: We've already improved our capabilities and we're making their lives more difficult.

AL: Vice Admiral Morales, before the interview, you mentioned that you would speak with passion, but I see you more as a statesman.

RMA: Thank you.

AL: You convey the vision of a statesman. I think the information you've shared with us is privileged; it's very valuable for dissemination, not only for the general population but also for those of us in academia who try to explain problems by giving meaning to reality through scientific research. And I believe that all this information you've provided will stimulate many other research questions, other lines for my fellow researchers. Thank you very much for allowing us, from UMAR in Oaxaca, on the southern Pacific coast, to disseminate this information.

RMA: Thank you. This is a project of the Mexican State, and I think that's how we should see it, as a project of the Mexican State to improve the quality of life, primarily for the people in the region but, consequently, for our country as a whole. So, there's the project we're pushing forward with all our efforts. What we've achieved so far is the result of great teamwork that's not only from the Navy Secretariat or just from the Interoceanic Corridor, but from all federal, municipal, and state government agencies.

AL: Very well, thank you very much.

RMA: Thank you. ☘

