Borderline- Part 4

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The Aral fleet registers 710 vessels, with 570 privately owned and 140 owned by the state. That number is likely to be much larger due to smaller boats not having registration. 483 of these vessels have grants for fishing. According to Mathews’ observations, the temporary camp site on the Kok-Aral site can number as many as 100 fishermen. There is also a long tradition of ice-fishing near the shore of the North Aral in the winter period.

Most water reservoirs in Kazakhstan are filled in the autumn-winter period from October to March and drawn from April to September. “The contradiction is that irrigation requires drawing water in the spring when an increase in water level is in the interest of fishery as fish start to spawn.”

1 Ismukhanov and Mukhamedzhanov (2003).
**seasonality**

**Tourist Season: Spring + Autumn**

With Aralsk’s cold winters (−37.9° F) and hot summers (116° F), especially with the lack of surrounding water to moderate temperatures, the tourist season occurs biannually during the **spring** and **autumn** seasons. This means a biannual schedule for the supporting industry, which consists of the Aral hotel, and the tour company Aral Tenizi, which organizes excursions to the ship graveyards, Aral shores, and the Kok-Aral dam.
While it is not possible to bring the Aral Sea back to its former size and scale of economy, one can create industry for its biggest resource: its people. The two biggest assets of the North Aral Sea are (1.) its fishing industry and (2.) its tourism industry.

**Fishing Industry:**
The construction of fisheries and introduction of fish hatcheries can lengthen the fishing period and provide more employment and stability for the local community.

**Tourism Industry:**
An alternative tourism industry based on positive development can provide a counterpoint to the current disaster tourism that creates humiliation and tension between locals and tourists.

The Kok-Aral site is rich in resources, but is remote and inhospitable.

The creation of habitable community spaces is key to creating a more durable community.

**Transportability:**
Access of material supply requires structures that are light and transportable, and flexible to changing programmatic needs.

**Climate:**
The variable climate of the Kok-Aral site requires climatic performance to endure extreme weather in summer and winter periods, thereby lengthening the overlap in tourist and fishing seasons.
3. Motivate Ownership

Ownership of industry, of action.

**Incrementalism:**
Community construction on a **unit by unit basis** allows equitable and integrated participation in community development. The community becomes the sum of individual contributions rather than the single architectural feat.

**Flotation and Interchangeability:**
Flotation offers interchangeability of the unit, as a method for **shrinkage/growth** of individual businesses and measures for their competitiveness.

**Innovative Business Types:**
Ease of adaptations to scale of operation will create businesses that otherwise would exist on land.

4. Empower Longevity

Careful considerations for the deployment of units.

**Supporting Infrastructure:**
Understanding the Kok-Aral as a **linear infrastructure** that will serve as a backbone to a floating community requires design decisions in terms of how to create relationships between the units and clusters of activity.

**System Flexibility:**
Flexibility on the scale of infrastructure guarantees functionality in spite of any possible changes in industry, water level, salinity, and biology.
**fish hatchery**

With use of present water level, a hatchery for local fish species requires little maintenance. Hydroponic vegetation allows alternative plant growth, while the fish hatchery is meant to stimulate the regrowing local economy by replacing unsustainable agricultural and fishing practices and provide a basis for education.

**urban infill**

Alternative to the growing functions, an urban grid provides an influx of people and movement. The new coastlines will have to confront the relationship between land and water travel, new views and surfaces.

1. **housing fishermen**

Temporal program may house the 100 young fishermen during the Spring and Summer for spillway fishing on the Kok-Aral. This also includes ancillary spaces such as those for drying and processing fish, restaurants for tourists, etc.

2. **tourist lodging**

As a counterpoint to the present “Disaster Tourism”, these units may also morph into lodging for tourists. These provide more comfort amenities, but also are a base from which to educate foreigners.
Architectural Opportunities

As a fishery/hotel project (ecological demonstrator) the Aral's return indicates an opportunity for an architecture that demonstrates resiliency, and adaptations to water-related changes in salinity, level, location, and species. As the Aral shrank it receded from harbors, it forced its fishermen to extend their ports, and finally relying on helicopters to transport their catch to processing plants once the sea had receded too far. This indicates that a fixed geography is not appropriate for this project, but rather a floating community that houses fishermen and canning facilities, and simultaneously is able to foster a vibrant hotel/tourist community. While flotation offers resiliency in relation to geography and water level, it also allows the interchangeability of its components, as a mechanism for growth/shrinkage of its commercial fishing and tourism functions.
Design Opportunity
The present site condition as a place of convergence that relies on the three month fishing period demonstrates an ideal place for a temporal architecture.

Kazakh Yurt
The yurt typology was developed in Central Asia, as a portable dwelling structure for nomads. A compression wheel supports roof ribs, which are also supported by a lattice wall. The structure is covered by fabric for insulation.
Dre Wapenaar: Pavilions and Tents

Dre Wapenaar is a sculptor and designer that works with canvas, steel and wood to create architectural tent structures that relate to the relationship between its occupants.

SoundBox Pavilion, 2013

The SoundBox pavilion takes advantage of the acoustic capabilities of tensile structure. This canvas tent structure positions a large audience around the musicians. Half the audience faces away, to completely engulf the occupant in sound.

Birthingtent, 2003

As a project that explores intimate interaction and distance, the birthing tent is a temporary structure for giving birth, and the enjoyment of this moment. The skylight gives views, while a bench on the perimeter is for family, friends and nurses.

[temporary structures] Dre Wapenaar
Rotterdam
Makoko is an example of a resilient, self-sustaining community as a floating slum in Lagos, Nigeria. It was first established in the 18th century as a fishing village, and consists of an urban fabric on stilts, known as the “Venice of Africa.” It is a self-governing community, with an estimated population of 85,840, although could be much higher considering that the area was not officially counted in the Nigerian census in 2007. Community security is the responsibility of “area boys,” young men that defend territory with threat and violence in exchange for money. Due to increasing danger in the area, the government provided a 72-hour notice for eviction before clearing many residences.

1. This Day (May 1, 2009). "Makoko Residents And Their Unwanted Guest". Africa News
2. UN Integrated Regional Information Networks (September 5, 2006). "Lagos, the Mega-City of Slums". Africa News.
Nigerian architect Kunle Adeyemi devised a concept for a low-cost public structure. His Makoko Floating school was a triangular frame, taken from the local vernacular of the A-frame roof that resists the heavy rains of Lagos. The structure was set to float with 250 plastic barrels, which creates a rainwater collection system at the bottom. The lowest level platform, the largest, is a 1,000 square foot space that serves as a play area or public space in which fishermen can also make nets when the school is not in session. Classrooms above serve 100 elementary school students. The architect’s intention is that this typology is repeated to meet other public functions such as housing and healthcare.1

Environmental Control

- rainwater control
- crossventilation
- louver shading
- barrels flotation
- rainwater collection
Possible Morphological Adaptations

Aquaponics: Fish Farm + Greenhouse

Desalination Still

Housing/Healthcare Typology

Market & Public Space
The Kok-Aral site is rich in resources, but is remote and inhospitable. The creation of habitable community spaces is key to creating a more durable community. Air Cushion cladding is therefore an ideal for an architectural unit to be transported to site. This technology is light and performative with relation to climate control.

**Technology:**
In recent years, ETFE has emerged as the material of choice for air cushion cladding for technologically innovative buildings such as the Media TIC in Barcelona, the Eden Project in Cornwall, the National Space Centre in Leicester, and the Khan Shatyr in Astana, Kazakhstan. The advantages of ETFE are its thinness and light weight, with resistance to tear and environmental performance.
[technology] the climatic envelope
pneumatics: lightness, performance, & soft structures

Media-TIC; Barcelona
Enric-Ruiz Geli, Cloud 9, 2008

Air Pavilion, Magna Project, Rotterdam
Wilkinson Eyre Architects, 2000

National Space Centre, Leicester,
Grimshaw, 2001

Eden Project, St. Austell,
Grimshaw, 2001
Above: The Leicester Space Center uses a perimeter air cushion to control interior climate.

Below: Typical details of external wall with ETFE cladding
the climatic envelope
Khan Shatyr, Astana, Kazakhstan
Norma Foster

Above: Adapted from the yurt typology, the radial cables supported by a large mast counteract lateral wind forces, and held together by circumferencial cables for suction.

Below: detail of cable from below.
Node detail of ETFE cushions at the Eden Project
The ETFE cushions are fixed directly to the primary structure. The structure and ETFE cushion envelope of the world’s largest plant enclosure weighs less than the air contained inside.

soft structure
Eden Project, Cornwall, UK
Nicholas Grimshaw
**performance**

Media TIC, Barcelona, Spain
Enric Ruiz-Geli [Cloud 9]

Above: Daylighting strategy at the MediaTIC building in Barcelona, Air Cushions have three membranes that react to current lighting conditions. Below: Southwest facade of the building features long hanging air cushions that fill with nitrogen gas to opaque the facade and make it more reflective.
Formal Strategies: the Definition of a Unit

Incrementalism:
Community construction on a **unit by unit basis** allows equitable and integrated participation in community development. The community becomes the sum of individual contributions rather than the single architectural feat.

**Flotation and Interchangeability:**
Flotation offers interchangeability of the unit, as a method for **shrinkage/growth** of individual businesses and measures for their competitiveness. Ease of adaptations to scale of operation will create businesses that otherwise would exist on land.

**Form:**
A study of conventional typologies provides a basis for generating architectural forms that relate to exchangeability.
[form] conventional water-based vernacular
Before the 1990’s, a “splav,” or barge, was a privately owned lakeside or riverside getaway, for friendly get togethers and private parties. After the nineties, with a changing political climate in Serbia, they have changed into popular destination venues, where the Serbian elite spends the night time until the hours of the morning.

As these units line the edge of the Danube river in Belgrade, they are grounded by platforms that swivel, allowing the structures to adapt quickly to changes in water level. These structures are also quickly moved about and replaced on the basis of business competitiveness. Construction and deconstruction happens quietly offsite.

Google Aerial Image:
44.813352,20.444342

Belgrade, Serbia

¹http://www.jingleweb.nl/index.php/paginas/offshore-days-keeps-goin/
Google Aerial Image: 37.901059, -121.610798

Discovery Bay, 1964. Planned waterfront community by Sacramento-San Joaquin River Delta, built on land previously used for growing barley and potatoes.

Google Aerial Image: 53.039496, 5.775326

Waterpark Sneekermee by Waterstudio.NL
resiliency
The floating city of Belen is an informal mestizo settlement along the Upper Amazon river. Due to the seasonal rise in water level, the structures are built on balsa logs as a floating mechanism. Iquitos does not have any roads connecting to other cities. It is therefore considered the largest isolated city in the Americas.

A similar typology exists in Kazakhstan. The floating structure illustrated is a conventional structure for fishing and drying fish in the Balkash-Alakol region of Kazakhstan, particularly in the Lake Alakol.
The Principality of Sealand was an abandoned WWII anti-aircraft platform, seized by Roy Bates, a pirate radio operator in the 1960s. Because it was in international waters 3 miles from the coast, it became an unrecognized sovereign state.

Image
Ian Boyle, 7th July 2009

Roy Bates became King Roy, created passports and a currency. Several legal incidents supported Sealand’s claims of sovereignty, in which the British government ruled that it was out of their jurisdiction. The first incident involved Sealand firing warning shots at a nearby boat. A second incident occurred as some Germans seized the platform, and were captured in a helicopter raid, after which they were held prisoners for several weeks, without the British government being able to get involved.

Image
Tony Crowe

The Sea Fort typology offers a method for deployment. Once it is deployed it is fixed into place, which defeats the purpose of the exchangeable unit. It does, however, offer a flexibility of placement, and may then operate as a node of activity: to provide moorage, safely control electricity, water purification, and other technical aspects necessary to sustain community on the Kok-Aral.

Similar to a Sea Fort, the Oil platform is necessarily more stable. Due to their remote locations, they characteristically have means for continual repair, such as cranes and electricity generators, that sustain its operations.