



<http://www.okitour.net/sightseeing/tatsujin/00003/>



<http://www.sankei.com/premium/photos/150227/prm1502270007-p5.html>

Impacts of Coral Reefs in Amphibious Operations

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- **Why Coral Reefs, Now?**
- **What Impacts?**
- **How to Minimize the Impact**



<http://www.bangkokpost.com/learning/learning-from-news/302948/tiny-islands-everyone-wants>

Why Coral Reefs, Now?

Pacific Theater in WW II ;
Tarawa, Peleliu...

Tropic Zone



Cold War;
Norway
Northern part of Japan

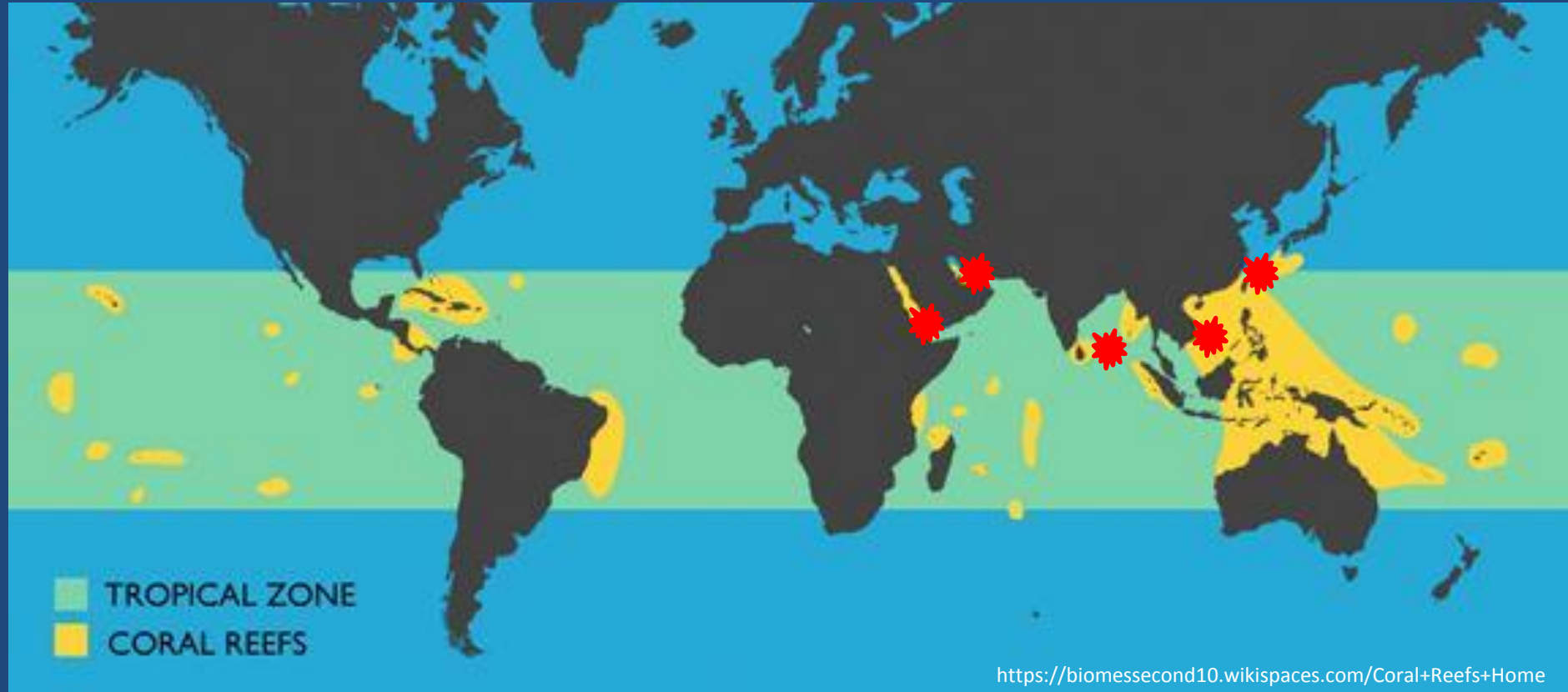
Subarctic Zone



Why Coral Reefs, Now?



Tropic Zone



Coral reefs exist in waters of instability.

Why Coral Reefs, Now?

Typhoon Haiyan in November 2013



<http://www.ibtimes.com/philippines-after-typhoon-haiyan-fastest-q4-gdp-growth-asia-after-china-1551846>



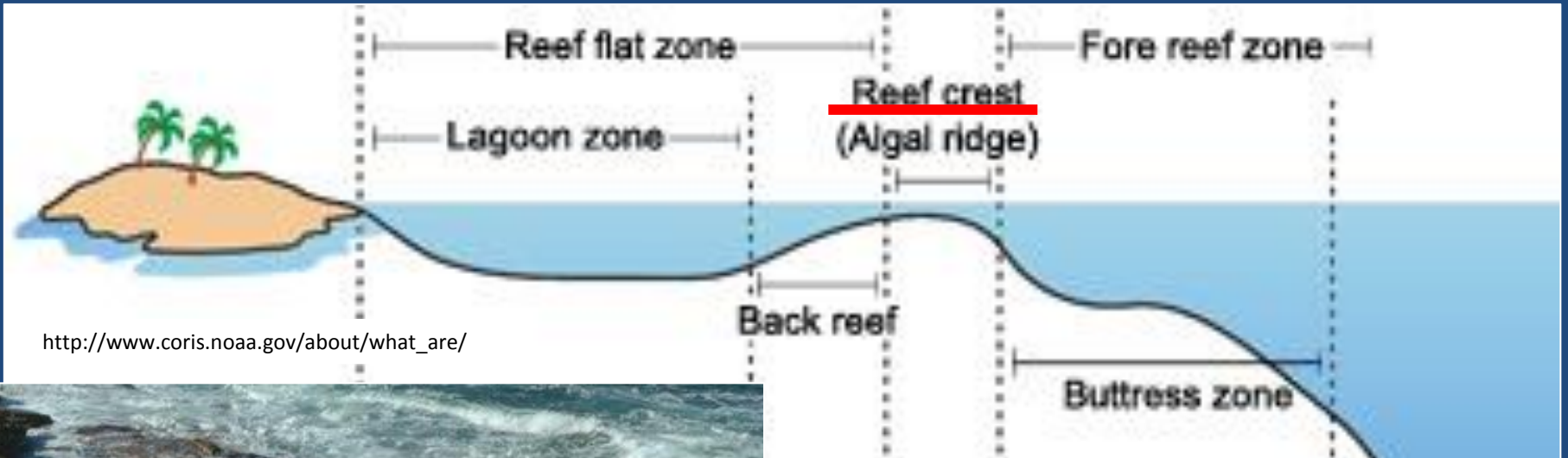
<http://photo.sankei.jp.msn.com/kodawari/data/2013/11/26JSDF/>



<http://edition.cnn.com/2013/11/11/world/asia/typhoon-haiyan-vignettes/>

***Coral reefs exist
in disaster prone zones.***

What Impacts?



http://www.coris.noaa.gov/about/what_are/



<http://www.shutterstock.com/video/clip-2383055-stock-footage-waves-splashing-against-the-coral-reef-on-the-shore-of-bare-island-in-la-perouse-sydney-australia.html>



<https://www.youtube.com/watch?v=Zbm0LGFyb-U>

Enforcing to Run onto and Sail over

What Impacts?



Enforcing to Use Small Ports

How to Minimize the Impact

➤ Improvement of Amphibious Vehicle



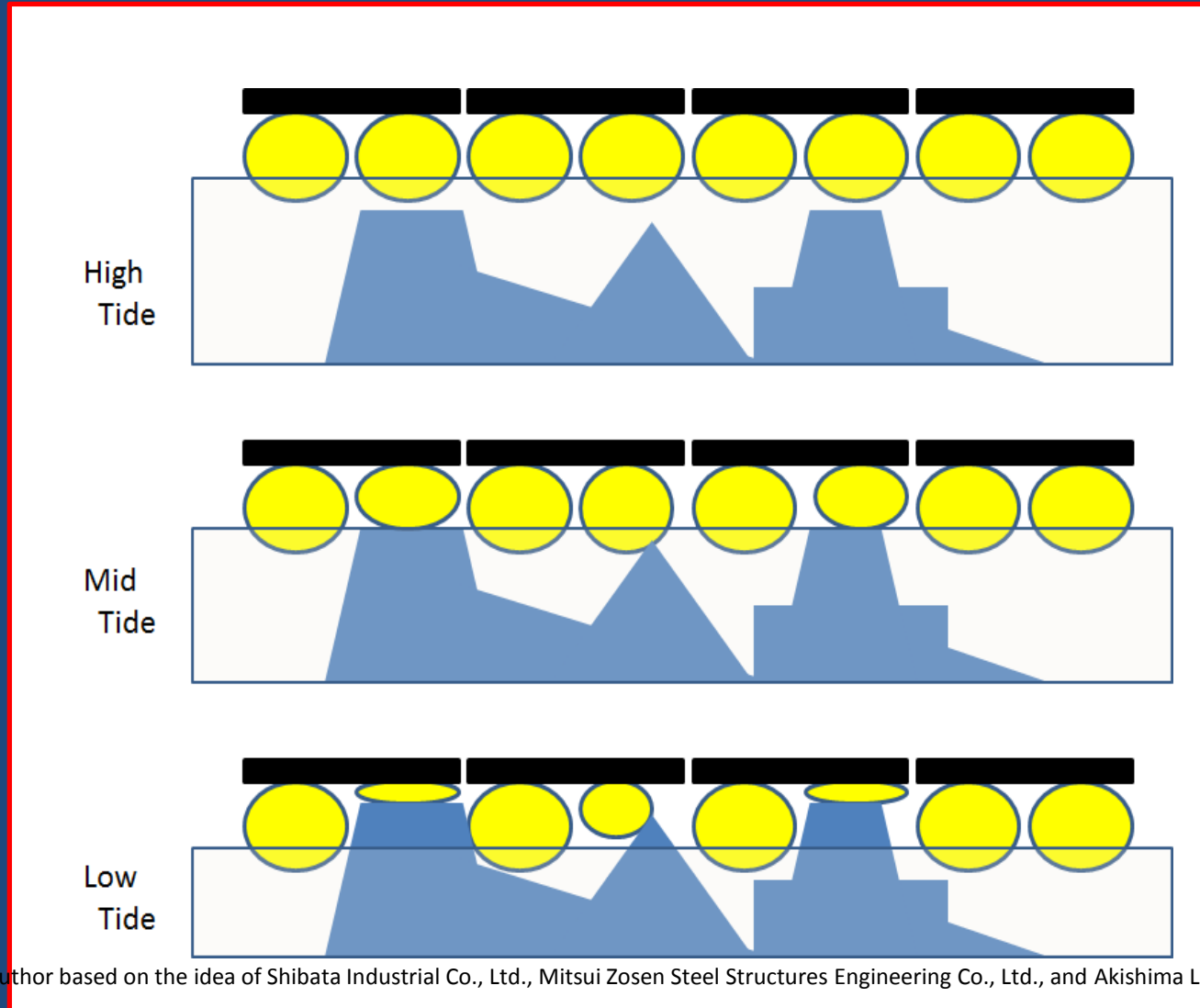
How to Minimize the Impact

➤ Improvement of Pontoon Bridge



How to Minimize the Impact

➤ Improvement of Pontoon Bridge



Written by author based on the idea of Shibata Industrial Co., Ltd., Mitsui Zosen Steel Structures Engineering Co., Ltd., and Akishima Laboratories (Mitsui Zosen) Inc

How to Minimize the Impact

➤ Improvement of Landing Craft



<http://www.mod.go.jp/msdf/formal/gallery/ships/airc/lcac/lcac.html>



https://en.wikipedia.org/wiki/LCM-1E#/media/File:LCM-1E_L602.jpg



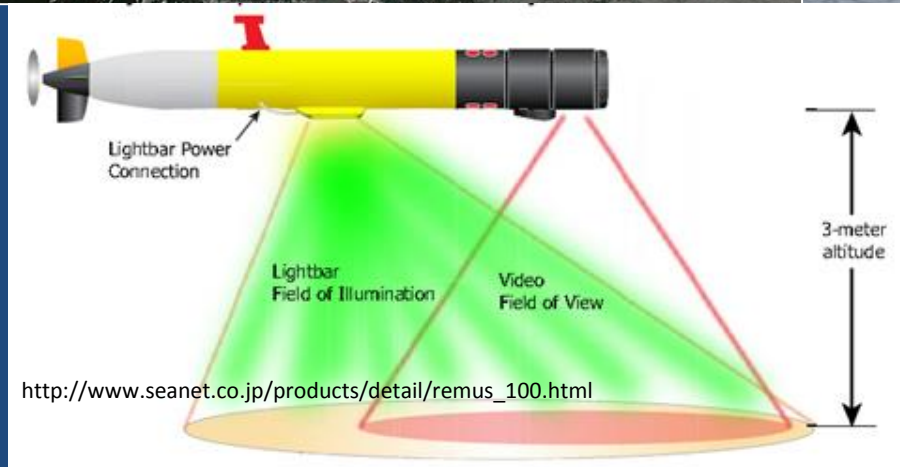
<http://www.marineinsight.com/sports-luxury/lcat-a-multi-purpose-supply-catamaran/>



<http://www.bmtdsl.co.uk/bmt-design-portfolio/bmt-caimen-landing-craft/>

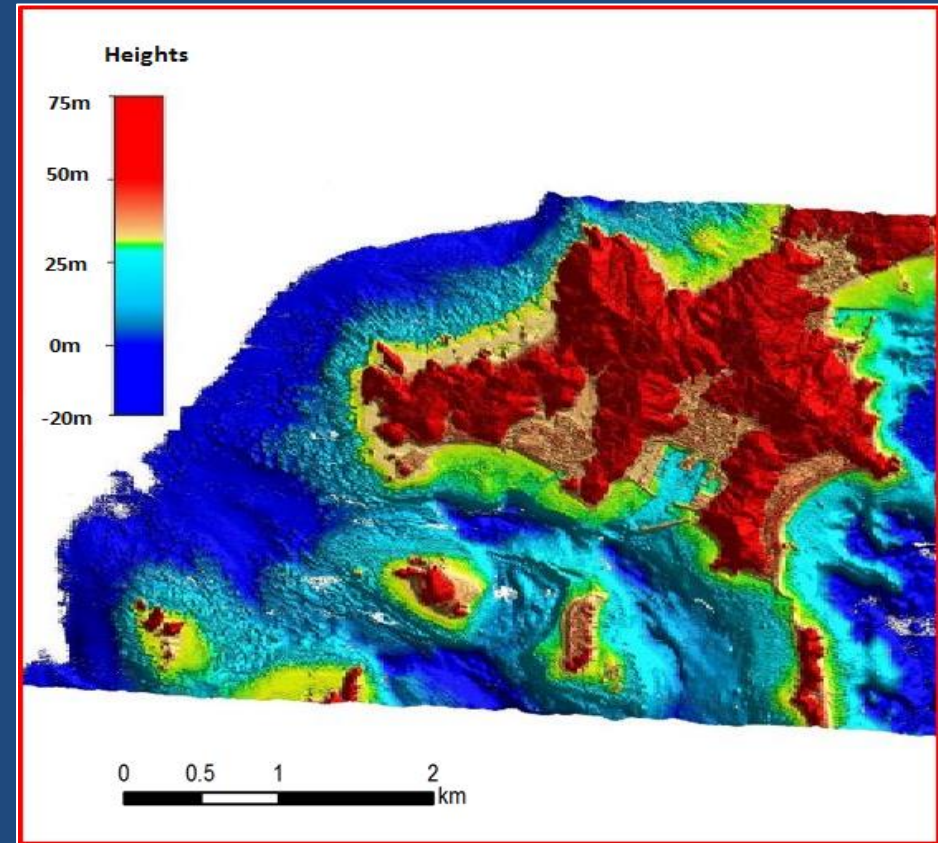
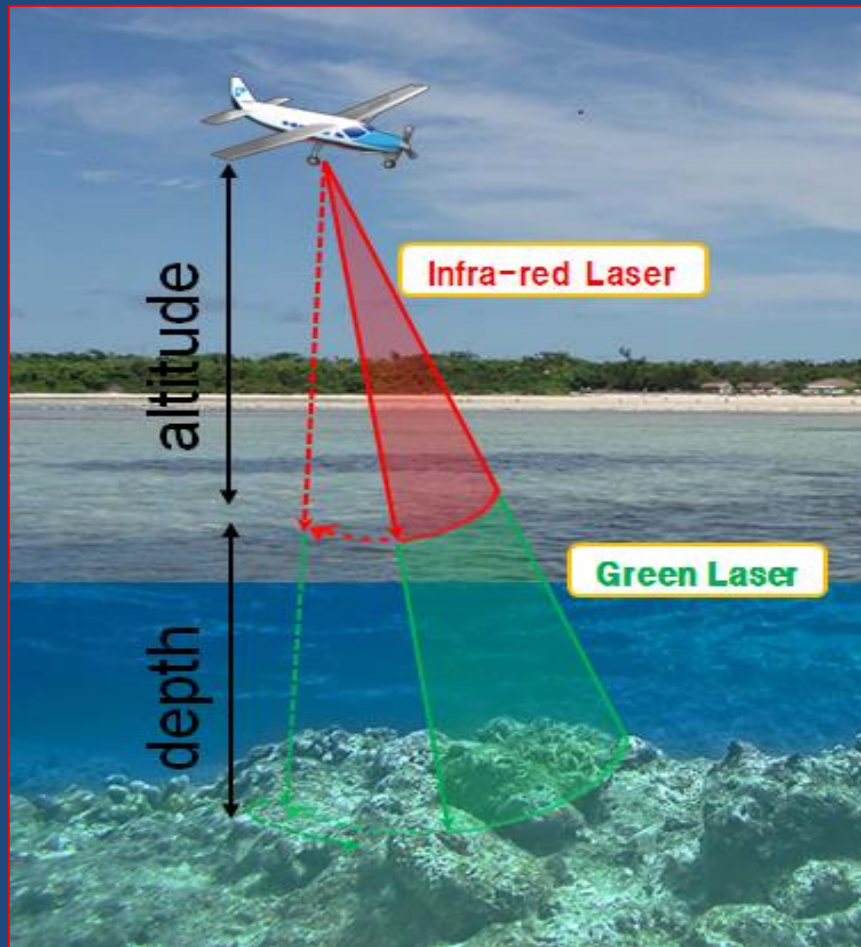
How to Minimize the Impact

➤ Improvement of Situation Awareness Means



How to Minimize the Impact

- Improvement of Situation Awareness Means
Airborne Laser Bathymetry (ALB)

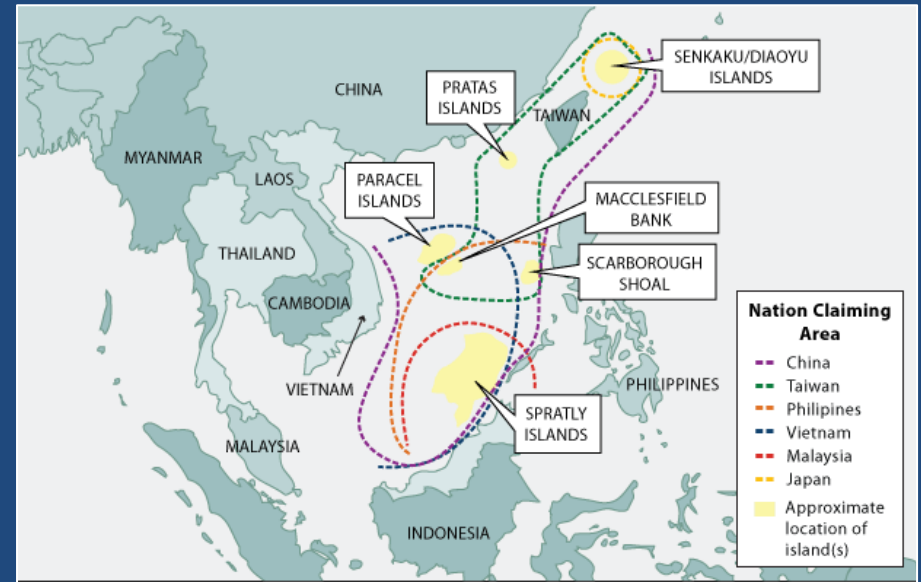


Provided by PASCO Cooperation and Leica Geosystems

How to Minimize the Impact

Improvement of

- Amphibious Vehicle
- Pontoon Bridge
- Landing Craft
- Situation Awareness Means



<http://www.coral-reef-info.com/coral-reef-biome.html>

