

Accelerated Marine Vehicle Autonomy, Sensing, and Communications

May, 2017

Inter-Vehicle Messaging

Web <http://oceanai.mit.edu/2.680>

Email:

Mike Benjamin mikerb@mit.edu

Henrik Schmidt henrik@mit.edu

Accelerated Marine Autonomy – “A Deeper Dive Into Behaviors”



Today's Material

From your Browser:

- <http://oceanai.mit.edu/ntu/lecture05.pdf>
- <http://oceanai.mit.edu/ntu/lab05.pdf>
- <http://oceanai.mit.edu/ntu/lecture06.pdf>
- <http://oceanai.mit.edu/ntu/lab06.pdf>

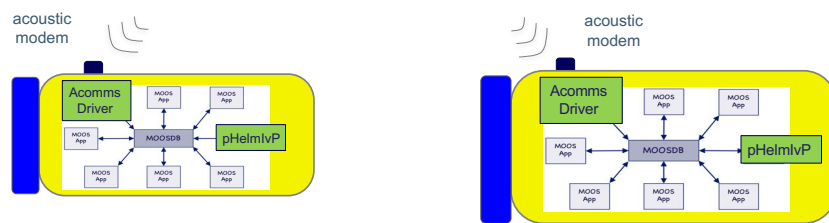
MIT 2.680 Spring 2017 – Marine Autonomy, Sensing and Communications



Inter-Vehicle Messaging

In this lecture:

- Inter-Vehicle Messaging
- The uField Toolbox - uFldNodeComms
- The uField Toolbox - uFldMessageHandler

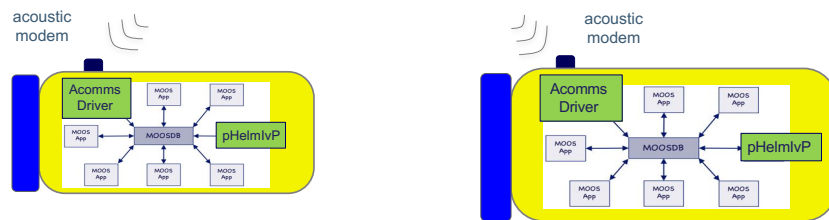


MIT 2.680 Spring 2017 – Marine Autonomy, Sensing and Communications

Inter-Vehicle Messaging LIMITS

In the real world (especially underwater), messaging is limited in:

- range
- bandwidth
- frequency

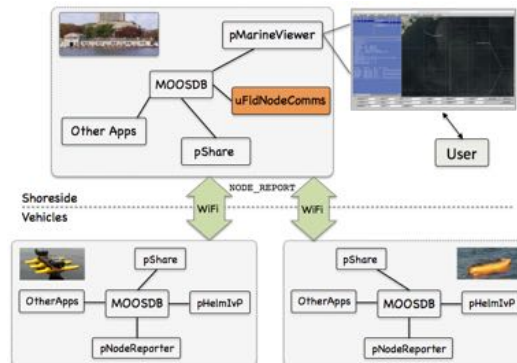


MIT 2.680 Spring 2017 – Marine Autonomy, Sensing and Communications

The uFldNodeComms App

Typical Application Topology

- The **uFldNodeComms** app runs on the shoreside, limits intervehicle messaging.
- A message from vehicle A to vehicle B, passes through uFldNodeComms
- uFldNodeComms enforces range, bandwidth and frequency constraints
- uFldNodeComms also monitors **NODE_REPORT** messages from each vehicle.



MIT 2.680 Spring 2017 – Marine Autonomy, Sensing and Communications

The uFldNodeComms App

The **uFldNodeComms** configuration parameters:

```
ProcessConfig = uFieldNodeComms
{
  COMMS_RANGE      = 200
  MIN_MSG_INTERVAL = 60
  MAX_MSG_LENGTH   = 100
}
```

Distance in meters between vehicles

Min time between messages from a vehicle

Max chars in a string message

In Lab 06 we will configure uFieldNodeComms:

```
comms_range = 100 // Must be within 100 meters of the other vehicle
min_msg_interval = 0 // Messaging as often as desired
max_msg_length = 0 // Signifies unlimited length
```

MIT 2.680 Spring 2017 – Marine Autonomy, Sensing and Communications

Lab 06 Preview

Inter-vehicle Messaging

In our last lab, we will build a simple two-vehicle mission:

- Each vehicle is loitering in it's half of an east-west op-area.
- Each vehicle periodically sends a message to the other vehicle to switch its region

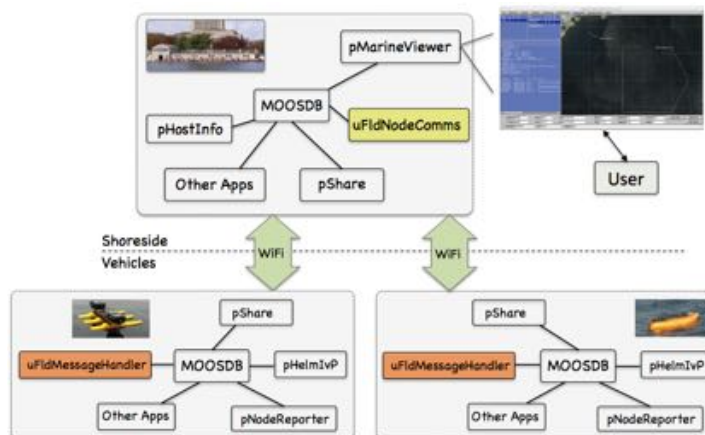


MIT 2.680 Spring 2017 – Marine Autonomy, Sensing and Communications

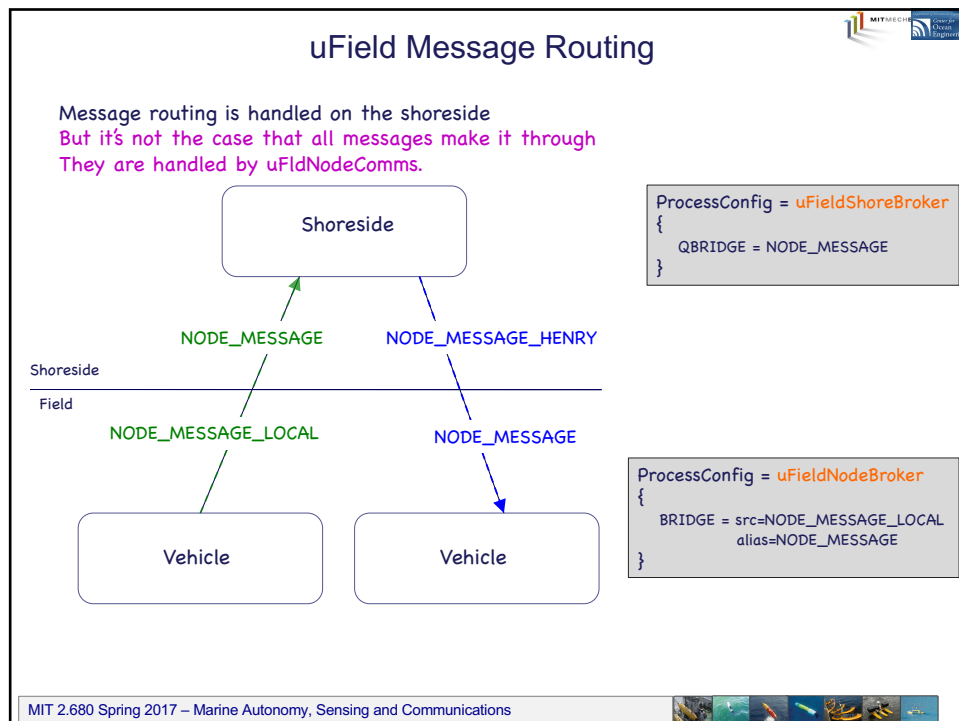
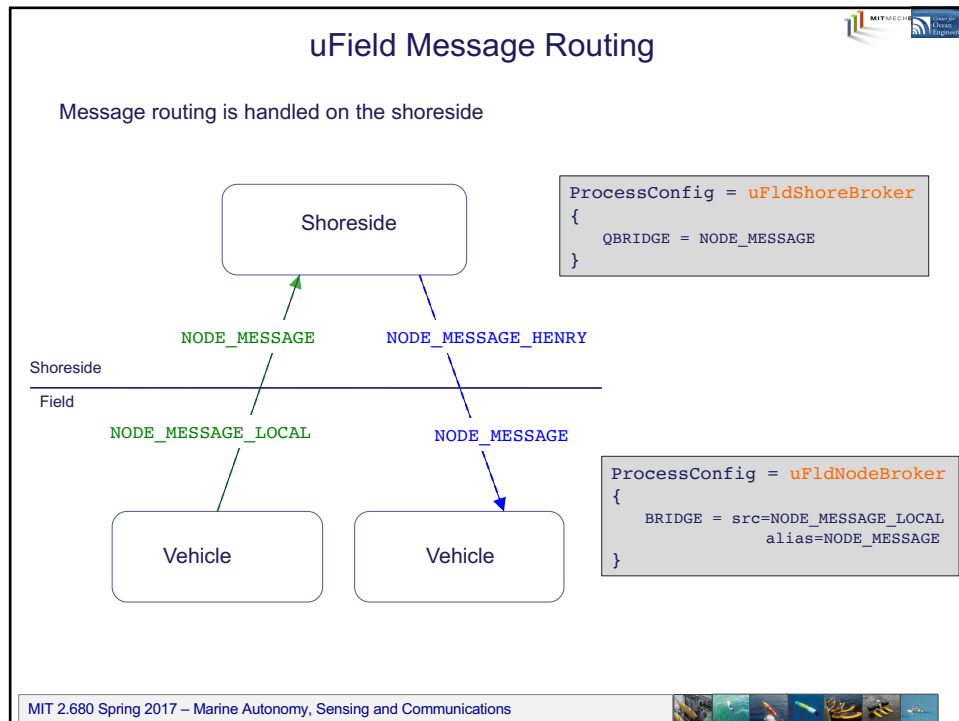
The uFldMessageHandler App

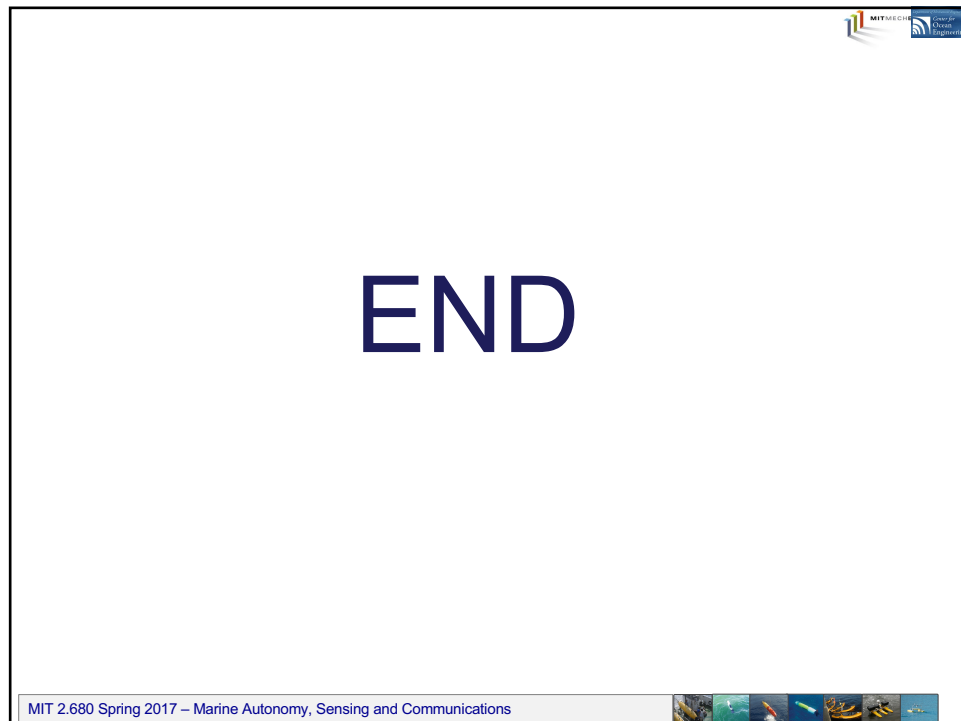
Typical Application Topology

The **uFldMessageHandler** app is running on all vehicles wishing to receive messages.



MIT 2.680 Spring 2017 – Marine Autonomy, Sensing and Communications





因為水下的東西要上傳到最上層要花很多時間，所以船要有自己的自動控制是很重要

有一個tree讓自動控制時，behavior不會相撞

因為在水下聲波可以傳遞的空間是規範著的(不同深度下溫度與壓力造成)，
呈波浪狀，因此在水下也要照著那個波浪通道走

以前在北極測的時候海水深度對應溫度浮力的情況跟現在不同了，通道也要重找
，一開始測的時候失敗亂跑