WebCAT
The WebCam Application Testbed

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Why a coastal webcam network?
High Frequency Radar
HF Radar National Network
Coastal camera systems

Argus Station

Holman and Stanley, 2007

Nearshore imagery - 1982

Holman and Stanley, 2007
Surfline web camera network
Webcam network vision

Develop a sustained operational webcam network with standardized imagery data acquisition and processing for a range of downstream applications

Standardization promotes innovation
The webcam testbed

• Initiated as a funded NOS stimulus project in late 2017
• Partnership involving SECOORA, NOS, NWS, Surfline, USGS, Axiom, Academia
• 75k initial funds included everything camera related, data management, workshop
• Proposed five cams in the southeast, but ended up with seven!
• Most cams have been in since at least February, 2018
Webcat camera locations

<table>
<thead>
<tr>
<th>Camera Location</th>
<th>Stationary or Panning</th>
<th>Elevation (m)</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buxton, NC</td>
<td>S</td>
<td>10</td>
<td>Runup</td>
</tr>
<tr>
<td>North Myrtle Beach, SC</td>
<td>S</td>
<td>15</td>
<td>Beach use and water quality; rip currents</td>
</tr>
<tr>
<td>Folly Beach, SC (north and south)</td>
<td>S (north) P (south)</td>
<td>15 15</td>
<td>General monitoring</td>
</tr>
<tr>
<td>St. Augustine, FL</td>
<td>P</td>
<td>10</td>
<td>Whale monitoring</td>
</tr>
<tr>
<td>Miami, FL</td>
<td>S</td>
<td>40</td>
<td>Rip currents; runup</td>
</tr>
<tr>
<td>Bradenton, FL</td>
<td>S</td>
<td>5</td>
<td>Rip currents</td>
</tr>
</tbody>
</table>
Camera installations
Data accessibility

WebCAT – Live Cameras and Historic Feeds

Web cameras are transforming how environmental monitoring is conducted. Video data is being used for applications related to transportation and commerce, preparedness and risk reduction, and stewardship of coastal resources.

The NOAA NOS Web Camera Applications Testbed (WebCAT) is a short-term project that is installing web cameras in five locations for various purposes – counting right whales, spotting rip currents, validating wave run up models, understanding human use of natural resources and more. This unique project is a public-private partnership leveraging the expertise and capabilities of private, nonprofit and public sectors.
What is coastal imagery data used for?

• Coastal Morphological change
• Hydrodynamics
• Human Impact on coastal resources
• Ecology, environmental and water quality
• Recreation and weather observations
Coastal Morphological change

Sandbar morphology

Lippman and Holman, 1989

Shoreline position

Plant et al., 2007

Nearshore bathymetry

Holman et al., 2013
Hydrodynamics

Rip current identification

Holman et al., 2006

Longshore current flow

Chickadel et al., 2003

Wave runup

Stockdon et al., 2006
Human Impact on coastal resources

Automated person counting

Tracking marine debris

Green et al., 2005

Kako et al., 2010
Ecology, environment and water quality

Ecological monitoring

- a) DOY 100, 2008, 12:15
- b) DOY 183, 2008, 12:07
- c) DOY 235, 2008, 12:15
- d) DOY 322, 2008, 12:15

Water quality

Sonnentag et al., 2011

Leeuw and Boss, 2018
What is the future for WebCat?

• How do we sustain and increase observations?
• How to do we develop and ensure standardized data collection, processing, metadata, QC, access?
• Can we continue to progress image analysis and applications?