COASTAL RESILIENCE CENTER

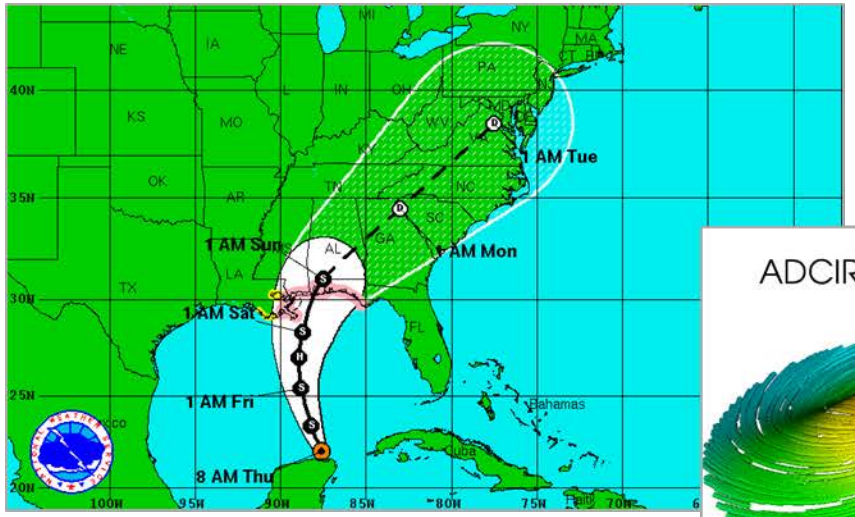
A U.S. Department of Homeland Security Center of Excellence

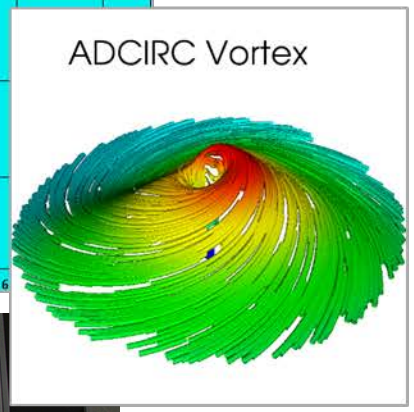
The ADCIRC Prediction System as a Conduit for Innovation

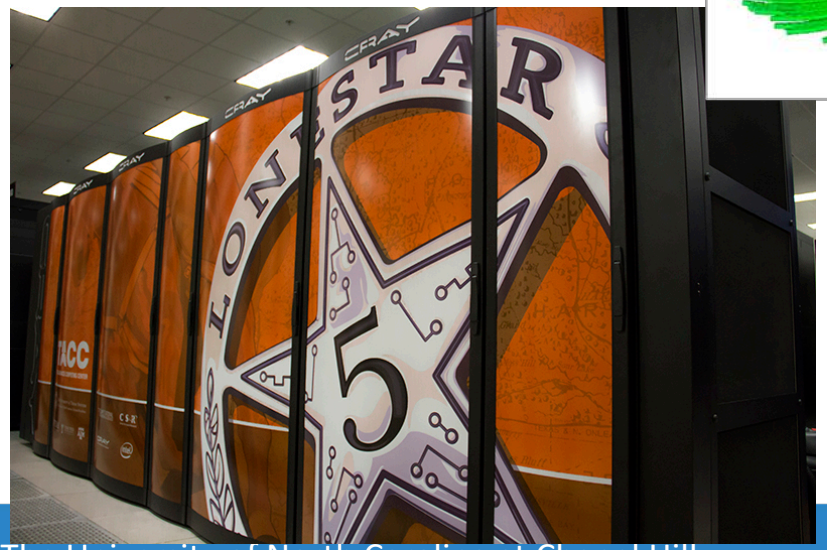
CRC Transition PI: Jason Fleming

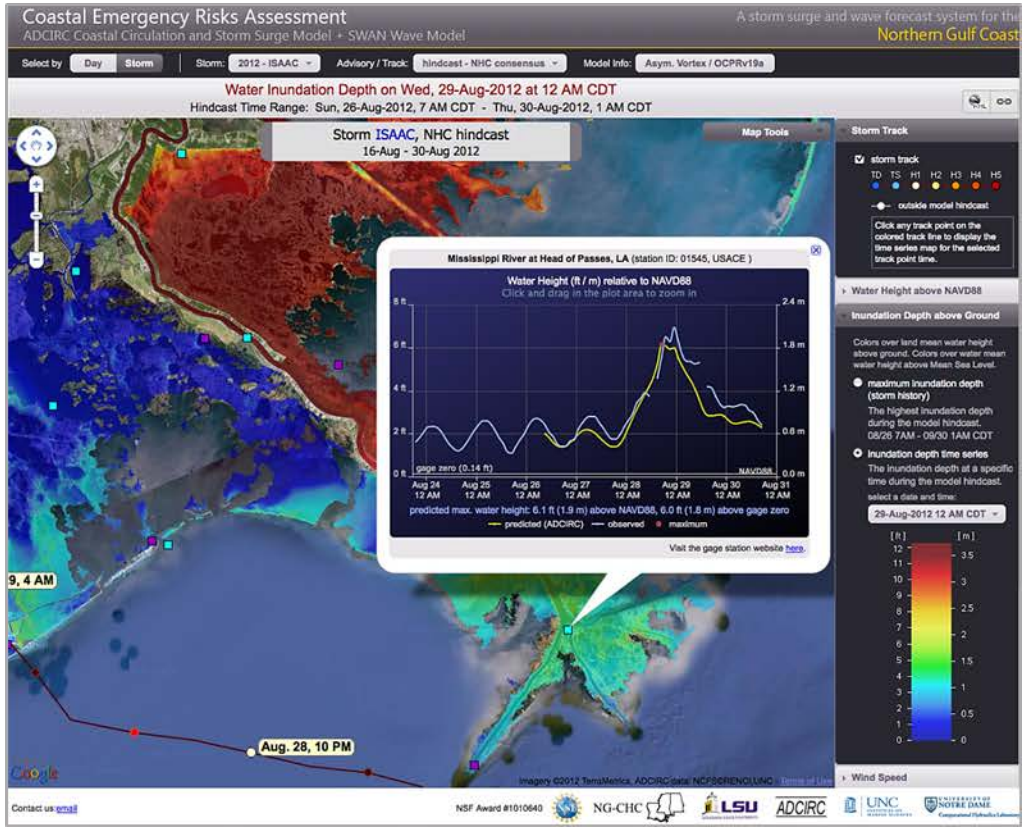
Seahorse Coastal Consulting, LLC

Real Time Workflow Concept for Decision Support









Seahorse Coastal Consulting Key Activities

Relationship Development

	Impact							Logistics						
ASGS Project	Reliability	Speed	Accuracy	Readiness	Sustainability	Docs/Training	Favorability	Refactoring	Prerequisite	Dependencies	Cooperation	Coordination	Effort Level	Description
Post Processing Expansion							5						2	Post process hindcasts and nowcasts and publish to THREDDS.
ASGS Shell/Brew Enhancements							2						4	Automatically install ADCIRC, FigureGen, gdal, et al.
Autofill River Flux							2						4	Automatically update river boundary conditions.
Nowcast Scenarios							-2						8	Carry multiple nowcasts with different forcing.
Nowcasts Between Advisories							-2						8	Run nowcasts between advisories, when BEST track file is updated.
Metadata Migration							1						8	From run.properties to scenario.yaml.
Dynamic Water Level Correction							-3						4	Finish testing offset.pl for dynamic bespoke water level correction.
Water Level Data Assimilation							0						4	Integrate python code for data assimilation.
Blended Winds							-1						8	Combine hurricane vortex winds with far field gridded meteorology.
System Wide Heartbeat							4						2	Heartbeat processes across the ASGS/CERA infrastructure.
Long Term Data Retention							4						8	Infrastructure for long term archive of input files and metadata.
SWAN Cleanup							5						4	Managing, manipulating, and posting SWAN hotstart files.
HPC Partner Meetings/Summits							10						1	Onsite strategy sessions with TACC, RENCI, LONI, and LSU CCT.
Uptime and Readiness Postures							6						4	Define uptime, readiness postures, and associated metrics.
Authentication Management							2						8	SSH keys, mailx permissions, accounts, allocations, priority access.
Preprocess First							1						8	Run serial setup jobs for all scenarios before submitting parallel jobs.
Parallel GIS Workflow							2						4	Generate CERA shapefile contours in parallel on HPC.
Resolution Enhancement							1						8	Integrate NCSU CCHT workflow and DEMs for wet/dry refinement.
Comprehensive Documentation							3						8	Operators' Guide, Developers' Guide, Onboarding, workflow diagrams.
Amazon Mail Server							4						2	Migrate all instances to Amazon Web Services (AWS) mail server.
Utility Migration to C++							0						16	Rewrite f90 utilities in C++ using external ADCIRCModules library.
Rolling Hindcast							1						8	Continuously produce sliding window hindcasts from nowcast data.
Metadata Insertion Into netCDF							-4						4	Write all metadata to netCDF files as global attributes.
Fully Variable River Flux							-1						8	Change type 52 boundaries from nowcast to nowcast.
River Forecast Boundary Conditions							0						4	Use river forecast center forecasts to compute boundary conditions.
Change Vmax the NHC Way							1						4	Integrate Yuji's code for changing Vmax in 5kt increments.

Strategic Planning

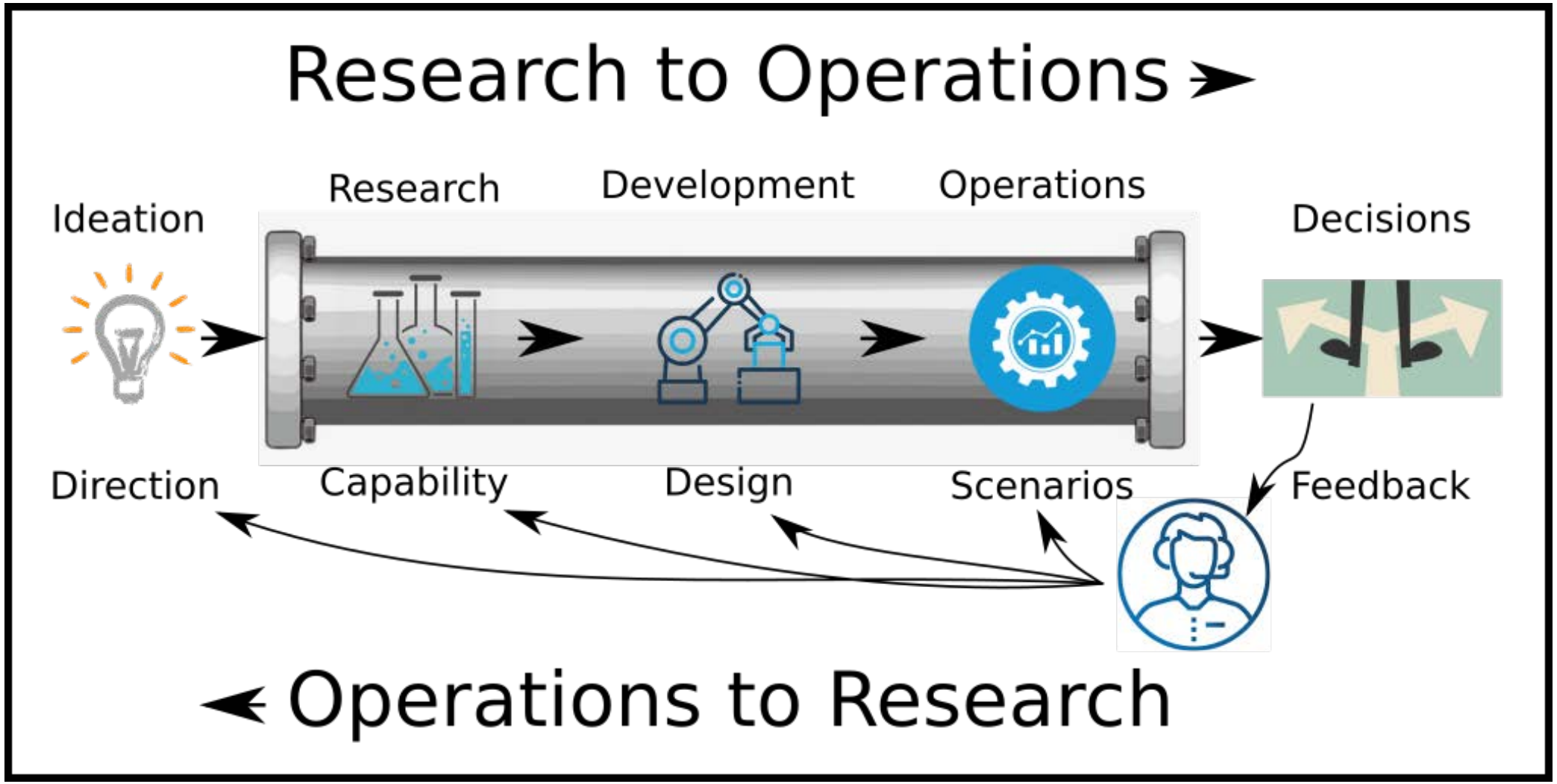
Code Development

Hurricane Operations

Vision

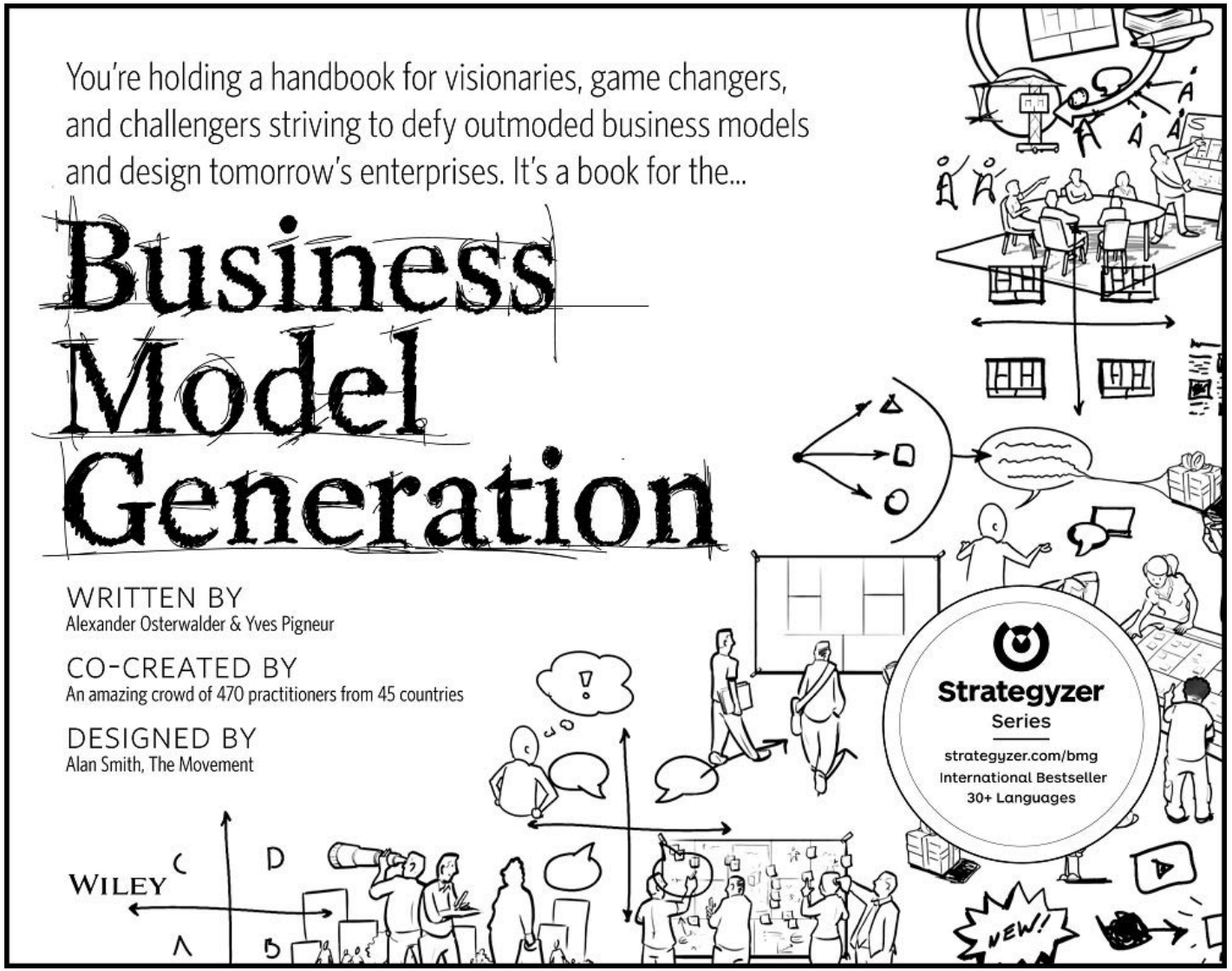
To establish a National capability for real time storm surge guidance.

Conduit for Innovation



Project	PI	Ideation	Research	Development	Operations	Feedback	Region Affected	Purpo
WaveWatch III	Ginis						US	Begin
Impact Self Reporting Tool	Becker						NE	Develc
SWAN Physics Simplfication	Resio						US	Accele
Add Resio Physics to SWAN	Dawson						US	Assess
Add Resio Physics to SWAN	Dietrich						US	Incorp
NE Coastal Watershed Model	Ginis						NE	Expan
Impact Self Reporting Tool	Fleming						US	Conce
Impact Database Prototype	Becker						NE	Expan
Impact Database Prototype	Fleming						NE	Implen

		Year 6 Stage						
Project	PI	Ideation	Research	Development	Operations	Feedback	Region Affected	Purpose
WaveWatch III	Ginis						US	Begin migration away from unsupported SWAN wave model
Impact Self Reporting Tool	Becker						NE	Develop web survey to replace manual data gathering
SWAN Physics Simplfication	Resio						US	Accelerate wave model by reducing physics
Add Resio Physics to SWAN	Dawson						US	Assess Resio wave physics : performance, accuracy
Add Resio Physics to SWAN	Dietrich						US	Incorporate Resio code into SWAN
NE Coastal Watershed Model	Ginis						NE	Expand scope to coastal river/rainfall flooding
Impact Self Reporting Tool	Fleming						US	Conceptual scaling of consequence threshold collection
Impact Database Prototype	Becker						NE	Expand scope to infrastructure at risk
Impact Database Prototype	Fleming						NE	Implement prototype consequences modelling system
Hotstart Interpolation	Dawson						US	Accelerate ADCIRC model with mesh switching
Hotstart Interpolation	Dietrich						US	Accelerate ADCIRC model with mesh switching
Hotstart Interpolation	Fleming						US	Develop and evaluate for real time application
Dynamic Load Balancing	Dietrich						US	Accelerate ADCIRC with Geographic Savvy
Dynamic Load Balancing	Fleming						US	Deploy in real time for evaluation
Downscaling	Kaiser						NC	Evaluate for merging with CERA platform
Downscaling	Fleming						NC	Evaluate for merging with ASGS platform
Minimum Viable Product	Fleming						US	Build and Test our first product
Operational System Health	Blanton						US	Design, develop and test new features
Overland Wind Model	Ginis						US	Improve hurricane winds at landfall
Overland Wind Model	Fleming						NE	Evaluate and develop for real time application
New England Mesh	Ginis						NE	Pre-enhance resolution of ADCIRC results in NE
Downscaling	Dietrich						NC	Post Enhance resolution of ADCIRC results in NC
Downscaling	Fleming						NC	Operate downscaling in real time in 2020 hurricane season
Operations : ASGS, ADCIRC	Fleming						US	Raise service standards to commercial grade
Operations : CERA	Kaiser						US	Raise service standards to commercial grade
Minimum Viable Product	Fleming						US	Produce our first product in real time operations
Financial Infrastructure	Fleming						US	New capability to accept diversified financial support
Operational System Health	Blanton						US	Operate ASGS Dashboard in real time
New England Mesh	Kaiser						NE	Add support for new mesh in CERA
New England Mesh	Fleming						NE	Add support for new mesh in ASGS
ADCIRC Week	Fleming						US	Training, Outreach, Feedback, Networking
Voice of Customer	Fleming						US	Structured feedback collection about our MVP
Operational System Health	Blanton						US	Collect use cases and feature requirements
RI Hurricane Ram Exercise	Ginis						NE	New England Visibility, Outreach, Feedback, Fundraising
RI Hurricane Ram Exercise	Fleming						NE	Present real time capabilities and gather requirements
Impact Self Reporting Tool	Becker						NE	Development and delivery of training for self reporting
Impact Database Prototype	Becker						NE	Gain feedback on database for infrastructure at risk
Impact Database Prototype	Fleming						NE	Demo prototype consequence modelling; collect feedback



ALL organizations have a "business model"

Business Model Canvas IDEA: Model Guidance Partnership

PROPOSED

Author: **Jason Fleming**
jason.fleming@seahorsecoastal.com

On: 1 December 2019

Iteration: 1.0

Key Partners

- COASTAL RESILIENCE CENTER — A U.S. Department of Homeland Security Center of Excellence
- Sea Grant Louisiana
- Seahorse Coastal Consulting
- RANSOM Consulting Engineers and Scientists
- US Army Corps of Engineers
- THE WATER INSTITUTE OF THE GULF
- FEMA

Key Activities

- D2O and O2D
- Financial Development
- Outreach
- Service Provisioning
- Model Guidance Coordination
- Decision Support

Key Resources

- Scientific Credibility
- Established Customer Relationships
- Strong Partnerships
- Recognized Branding
- Deep Knowledge and Experience with

ADCIRC ASGS CERA

Value Proposition

- Prestige, Relevance, Visibility
- Decision Support
- Best, Fastest Data

Customer Relationships

- CERA
- Events

Channels

- CERA
- Events
- Service Desk

Customer Segments

Multi-Sided Platform

- TACC
- renci
- NI
- LSU
- Government
- (Re)Insurance

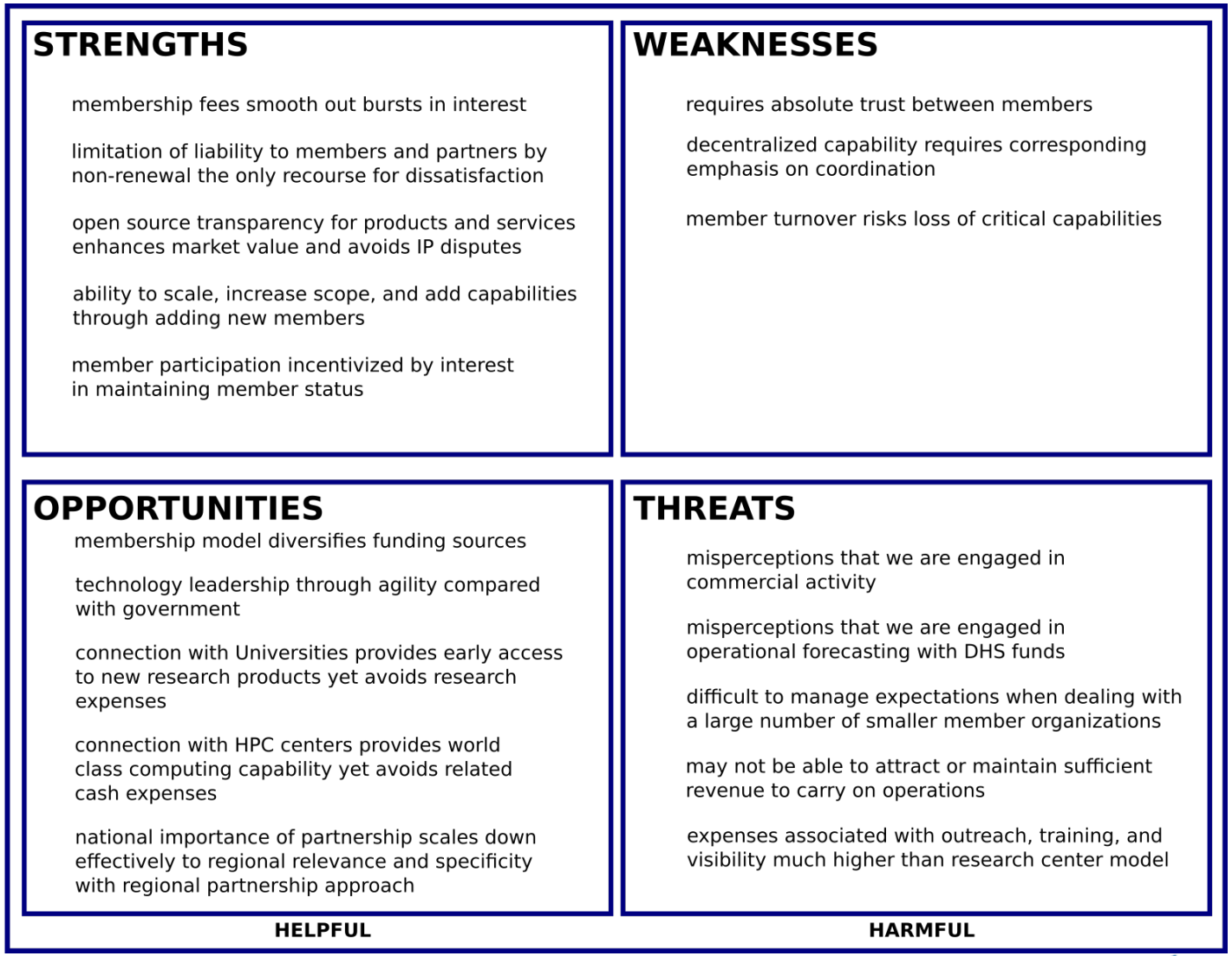
Cost Structure

Development and Operations:
Fixed + variable costs for personnel, economy of scope

Events, Outreach, and Support:
Dominated by variable costs, economy of both scale and scope

Revenue Streams

- Event Revenue
- In-Kind Development Outreach
- In-Kind HPC
- Membership Fees


INTERNAL
EXTERNAL
STRENGTHS
membership fees smooth out bursts in interest
limitation of liability to members and partners by non-renewal the only recourse for dissatisfaction
open source transparency for products and services enhances market value and avoids IP disputes
ability to scale, increase scope, and add capabilities through adding new members
member participation incentivized by interest in maintaining member status
WEAKNESSES
requires absolute trust between members
decentralized capability requires corresponding emphasis on coordination
member turnover risks loss of critical capabilities
OPPORTUNITIES
membership model diversifies funding sources
technology leadership through agility compared with government
connection with Universities provides early access to new research products yet avoids research expenses
connection with HPC centers provides world class computing capability yet avoids related cash expenses
national importance of partnership scales down effectively to regional relevance and specificity with regional partnership approach
THREATS
misperceptions that we are engaged in commercial activity
misperceptions that we are engaged in operational forecasting with DHS funds
difficult to manage expectations when dealing with a large number of smaller member organizations
may not be able to attract or maintain sufficient revenue to carry on operations
expenses associated with outreach, training, and visibility much higher than research center model
HELPFUL
HARMFUL

Questions

CRC Transition PI: Jason Fleming
Seahorse Coastal Consulting, LLC