Project Title: Video Monitoring Aboard Bering Sea Factory Trawlers--A Pilot Study

Proposal Summary

In partnership with industry, this project seeks to experiment with video monitoring hardware and software in hopes of developing a verifiable method of enumerating bycatch aboard certain factory trawl vessels. To develop protocols for optimal camera placements and system hardware, we will place video monitoring systems aboard two "H & G" trawlers (small and large vessels) during the summer of 2003. Each system will consist of four cameras, in tamper-proof housings, connected to a digital video recorder and GPS that are locked inside a tamper-proof case. Also aboard ship will be a trained project technician who will monitor system functionality. Data collected during the cruises will be stored in modules that can be archived for later retrieval. Once the data come ashore, our staff will develop a prototype software that will use machine vision to assist shoreside auditors as they review the gigabytes of shipboard data more efficiently.

Officials with Digital Observer LLC will be the Principal Investigators. Their company is the U.S. leader in developing shipboard video monitoring systems. We have drawn the experimental models for this project from our previous work in Alaska's longline fisheries and from work sponsored by NOAA's Alaska Fisheries Science Center and its Northwest Fisheries Science Center. We also plan to bring in a student from the UAF School of Fisheries and Ocean Sciences to act as our technician. Lastly, two software vendors: one for the shipboard data-gathering component and the other for the shoreside data analysis component, are recognized experts in their respective fields.

Project Responsiveness to NPRB Research Priorities

This project addresses the NPRB research priority, "Improve estimates of bycatch mortality."

Because most Bering Sea trawl fisheries operate under bycatch mortality quotas as well as quotas for targeted species, fishermen have a natural incentive to reduce—and sometimes hide—the halibut and other prohibited species they catch. Most Bering Sea factory trawl vessels outside the pollock fisheries carry just one fisheries observer, if they carry one at all. Because the vessels are typically more than 100 feet long, one person cannot see everything at one glance. Observers sample the catch and make species composition extrapolations based on those samples. Therefore observers on the vessels in question can only provide estimates, not actual counts, of bycatch and bycatch mortality. Observers typically take their samples at an inside station, usually near the point where the fish enter the factory. Because of this, the observers are often unable to see what is happening on deck or even in other parts of the factory. If the observer never gets to see the fish, it can not be used in the observer's extrapolation.

An article titled, "Sorting 'Em Out," (attached) which was published in the December 2002 edition of *National Fisherman*, describes in some detail the events aboard the F/V *Rebecca Irene* and of the consequences when a halibut pre-sorting scheme was brought to light. The

article also mentions possible violations by crew aboard the F/V *Unimak*, which is managed by Iquique U.S., the same company that manages the *Rebecca Irene*. Today, Iquique has volunteered both the *Rebecca* and the *Unimak* as platforms for this project. Our plan is to mount cameras to view the precise spot(s) aboard the *Rebecca* where the alleged halibut presorting took place.

The *National Fisherman* article points out how the impact of the actions of fishermen on one boat had a ripple effect on the fishery—and on the exploitation of the resource:

> "Given that there's only 20 to 25 boats in the fishery, reducing the number of halibut counted on one H-and-G freezer boat can lengthen the season for the entire fleet. According to an estimate presented to the North Pacific Fishery Management Council by NMFS' Alaska Enforcement Division, the pre-sorting on the *Rebecca Irene* extended the rock sole fishery by more than 30 days, resulting in additional $650,000 worth of fishing for the vessel."

In the article, Kodiak Fish Company Vice President Teressa Kandianis, who is volunteering one of her vessels for this project, is quoted:

> "Kandianis suggested the installation of video cameras aboard vessels would allow managers ashore to see for themselves what's taking place out on the water. 'Those things can come to the beach and concerns can be met with a review of the tape,' she says."

If the system proves feasible, it could be deployed on vessels throughout the fleet. The cameras will passively gather images that can be stored for later viewing. If questions arise, the images can be retrieved and analyzed. Human nature being what it is, these cameras will have the "cop in the rear view mirror" effect on fishing crews. That is, if you know you're being watched you are unlikely to do something foolish.

But the camera system will not stop there. It will also document that fishermen are returning live halibut to the sea. A camera placed on the stern gantry will view the area where the cod end is dumped and where fishermen sort the catch. The system will document the fishermen's efforts to return prohibited species into the water.

We now have the technical capability to document visually every haul the vessel makes and to capture moving images of every fish, alive or dead, returned to the sea. One of the project's goals is to determine how accurately the moving images we capture will allow us to determine the level of vitality of those fish. This capability could give fishermen and fisheries managers a sharp tool in further assessing bycatch mortality.

Placing a passive, unobtrusive layer of accountability and transparency on shipboard activities will help assure bycatch mortality estimates are more verifiable. This is in keeping with the above-referenced NPRB research priority.

Project Design and Conceptual Approach

Knowledge of Field and Relation to Previous Work

Since its conception in 1999, Digital Observer LLC's mission is to develop a high technology system that will supplement or replace human fisheries observers in many of Alaska's—and the world's—commercial fisheries. The basic elements of the system consist of video cameras, computers and specialized software. In 2000 Digital Observer won a Phase 1 demonstration grant from the Alaska Science and Technology Foundation. Our ongoing project is intended to accomplish three goals. The first is to demonstrate that a custom-designed, image recognition hardware and software package could be used to automate essential shipboard observer functions. The second is to initiate the regulatory change process that will allow for the permitted deployment of video monitoring devices in lieu of human observers. The final goal is to bring the technology to Alaska's and the world's commercial fishermen.

Since then we have collected and processed gigabytes of images and developed a software system that should soon be ready for final testing. No other company in the Unites States is as advanced as Digital Observer in developing and deploying integrated hardware and software for shipboard-based video monitoring systems.

Collaboration, Coordination and Experience

Working in cooperation with NMFS biologists and other respected scientists in the field, Project Manager Mark Buckley has delivered Digital Observer status reports at a North Pacific Fishery Management Council meeting, to the Council's Observer Advisory Committee, to the Alaska Fisheries Science Center's North Pacific Groundfish Observer Program, to the Alaska Chapter of the American Fisheries Society at its annual meeting, and at the Second International Fisheries Observer Conference in New Orleans, LA. At several of those meetings, Buckley has also spoken with and heard reports from NMFS biologists at the Alaska Fisheries Science Center and the Northwest Fisheries Science Center. Those individuals have managed their agency's experiments deploying experimental video monitoring systems aboard trawl vessels in the Bering Sea and the North Pacific. This research proposal represents a synthesis of research designs gleaned from in-house experience and experience provided by others.

For his part, Digital Observer partner Stosh Anderson is a voting member of the North Pacific Fishery Management Council and in that capacity spends a great deal of his time being "educated" in all manner of issues relating to Alaska's fisheries. In his roles on the Council and at Digital Observer, Anderson regularly collaborates with others to advance the wise use of Alaska's fisheries resources.

Please refer to each man's attached vitae for further information on their experience relating to this project. Because Digital Observer is a private research and development company working on a product that has yet to be finalized, we have not published results of our research to date.

At present we are aware of only four other video monitoring research projects taking place in U.S. waters. Digital Observer LLC is doing two of them: one based on longliners in Alaska and another based on bottomfish vessels in Hawaii. In 2002 the Alaska Fisheries Science

Center sponsored a "third wire" bird avoidance project on Bering Sea trawlers while the Northwest Fisheries Science Center sponsored a video monitoring study on a whiting catcher boat. In the past we have shared our information with those project managers and will continue to do so in the future.

Hypothetical Model

Our plan for this project is to deploy systems on two different Bering Sea H & G factory trawlers, including but not limited to: the "small" F/V *Alliance* at 107 feet, the "medium" *Rebecca Irene* at 140 feet and the "large" *Unimak* at 185 feet. Each vessel has a different layout and each presents different technical challenges and opportunities.

This project consists of three segments – Part 1, Part 2 and Part 3. The focus is to collect fish catch data and reduce it as much as possible before it is viewed by a trained human observer on land. The reduction is essential so that the data can be contained in digital media during the entire trip of the trawler.

Part 1 is the collection of fish catch imagery and ancillary data aboard the trawl vessel. By capturing images from specific cameras only when certain events are happening, data is reduced about 3:1 over the initial continuous recording period.

Part 2 is a further reduction of that data to the point where the presentation to the human observer enables the human's time to be maximally utilized. Reduction in Part 2 will depend on the volume of the catch. For heavy catches, the reduction is less. We believe reductions on the order a further 10 or 20:1 are possible.

Part 3 is a human observer sitting at a computer screen taking note of what he or she sees. This will be an intensive process, under the observer's control, and the process will be greatly speeded by the data reductions in Part 1 and Part 2.

Trawl Vessel Configuration

The trawl camera configuration is shown in Figure 1. There are 4 cameras – the mast cam, the gantry cam and two cams in the processing area.

Mast Cam – this camera will be solidly mounted on the mast. It will be set to view the working deck and adjacent seas and each image will be overlaid with longitude, latitude, time and date. The system will capture time lapse images from this camera 24 hours per day. The Mast Cam's purpose will be to document the general activities of the vessel: under way, deploying gear, hauling gear, etc. It will also view the area where the Gantry Cam will be located, assuring auditors that that camera has not been tampered with. Because this camera will always be "on," any gaps in the video record will easily be noted. Images gathered from this camera will be in continuous time lapse mode and will be relatively low resolution – 320 x 240 pixels. The sources of all the overlay data will be a GPS unit. All data will also be recorded digitally on the same media that holds all the camera images.

Gantry Cam – this camera will be solidly mounted on the gantry. It will present a 90° view of the deck. The system will be triggered by trawl a winch rotation sensor to capture images only as fish are being brought aboard. It will show the catch as it is brought aboard, the cod end dumped on deck, and the fish dropped into the live tank. It will also be overlaid

with GPS data. Recording will be high resolution – 640 x 480 pixels – and images will be recorded at 15 images/sec.

Processing Cam 3 – This camera will be in the processing area of the trawler. It will show fish as they are being brought out of the tank for processing. The recording will be high resolution – 640 x 480 pixels, 15 ips – and will be triggered by movement of the belt that brings the fish to processing. It will also be overlaid with at least time and date from the GPS system.

Processing Cam 4 – This camera will be placed 'over the shoulder' of the position where the observer works. It is also a high resolution camera – 640 x 480 pixels, 15 ips – and is also triggered by belt motion.

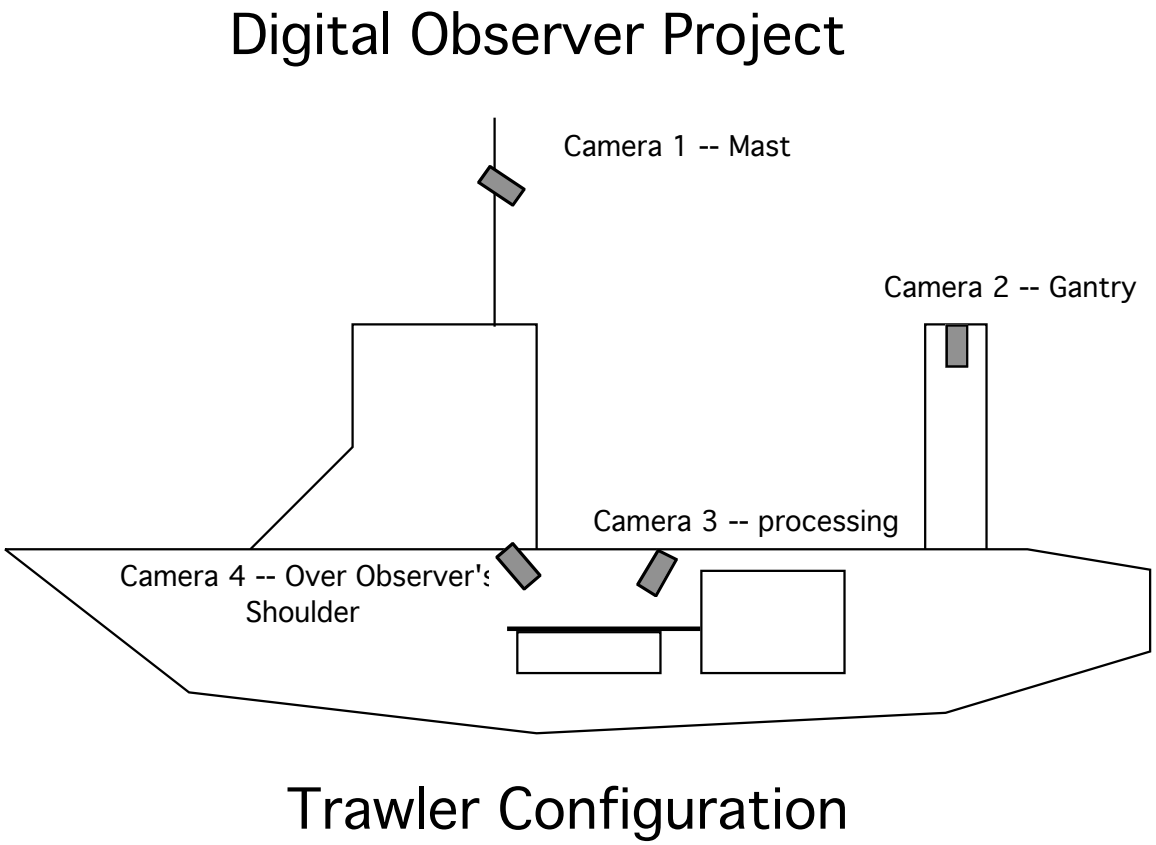

Fig. 1 Trawl Configuration

Part 1 -- Data Acquisition System

Part 1 consists of video and GPS/Time collection aboard ship for reduction and analysis in Parts II and III. It is important that the system constructed in Part 1 match perfectly both the onboard cameras and the data reduction in Part 2.

In the interest of cost control, we have decided to use an off-the-shelf digital video recorder system originally designed for security surveillance work. The DV8000 can record images from as many as 8 video cameras. It can digitize these images at selectable resolutions and rates (images per second). The image capture can be triggered from a variety of trigger

sources –hydraulic pressure, reel motion, motion within the image, clock, etc. This adequately covers the needs of the Digital Observer.

We plan to set the system to record fish images from the Gantry Cam only during periods when the trawl has been brought aboard and from the Interior cams when the factory is in operation. This will achieve a compression of approximately 12:1 over continuous recording.

GPS (longitude and latitude), time and date, will be collected from a GPS unit and overlaid on all video images by means of the Astro video overlay system which is specifically designed for this purpose. The same data will be digitally recorded along with the database of all images. Thus, these data are available in two different forms. (In later production versions of this system, the Astro devices can be replaced by one integrated unit that serves all 4 cameras at a lower cost.)

An important requirement for the Digital Observer is the enormous volume of data that must be recorded during a typical ship's operations before returning to port. A ship may be at sea for several weeks before the data can be recovered. A typical extended time (low quality) analog VCR can record for 8 hours.

The DV8000 with 640 Gigabyte external disk can record (without compression) 13 days' operations. As we add compression, we decrease quality and impact the quality of the fish count analysis. As part of this year's work, we will conduct experiments at sea to determine how much compression we can achieve and still support high quality analysis. It is anticipated that we can extend recording on one disk to 20 days. We can add more disk units to extend recording capacity. Figure 2 shows the schematic of the shipboard data collection system.

This equipment can be installed in a secure container, with power supplies for existing cameras so that the entire system can operate autonomously aboard ship. We should only need to change tapes when the ship comes into port.

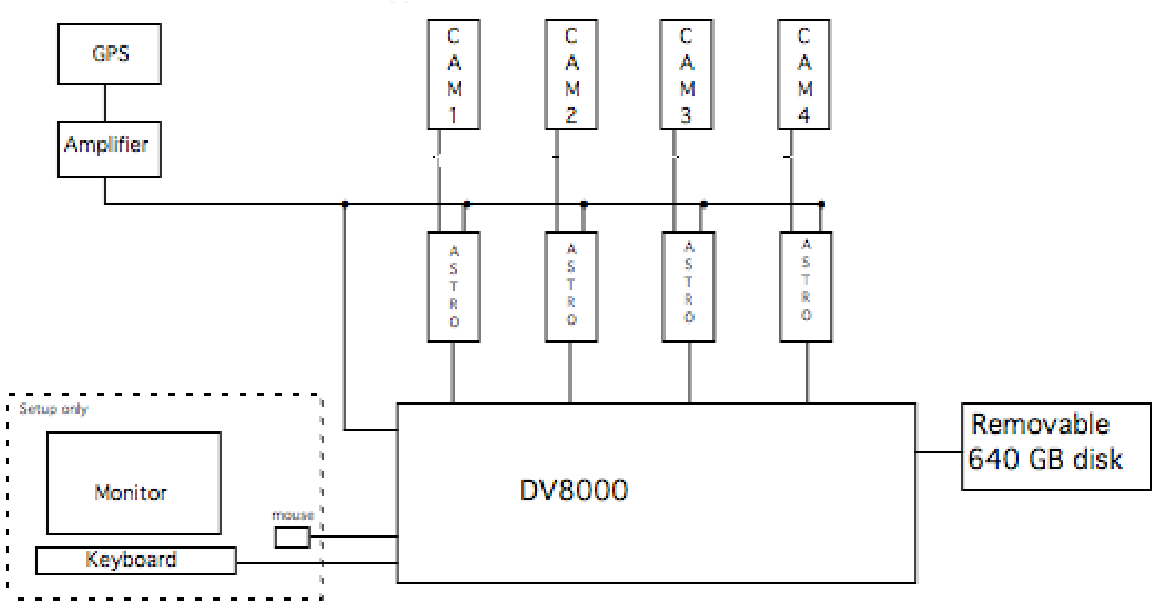

Fig 2: Digital Observer Project 2003 Part 1 System Schematic

Parts 2 and 3—Data Analysis

The stored images will then be sent to Part 2, in which further data compression can be achieved by removing video periods of no fish coming aboard. That process uses motion detection to identify presence of a fish. Since the equipment of Part 1 also possesses motion detection capabilities, we will attempt accomplish both Part 1 and elements of Part 2 with the Part 1 system. This could result in further cost reduction if it works, but this is highly dependent on local conditions.

Part 2 is a further reduction of that data to the point where the presentation to the human observer enables the human's time to be maximally utilized. Reduction in Part 2 will depend on the volume of the catch. For heavy catches, the reduction is less.

Basically, Part 2 involves the writing of special software that will "compress" the time it takes a human auditor to view and report on the images. We have selected Salmonsoft of Seattle and Portland, Oregon, to perform this function. Salmonsoft already has sales of fish recognition software that is used primarily to facilitate counting salmon as they migrate upriver past weirs or get caught by fish wheels. We believe that an adapted version of Salmonsoft's software, coupled with Digital Observer's already-developed systems, could greatly speed the time it takes for a person to audit many hours of images. Based on past experience, we believe reductions on the order a further 10 or 20:1 are possible. If Part 2 is funded, we will run a subset of images collected on the vessels through the software, which will then save to a separate file only those images containing pre-determined objects of interest: i.e., fish. Please refer to the attached Fishtick literature for an explanation of the software as it has been applied in the salmon fisheries. If the Board chooses to fund this option, we will adapt that format for this purpose.

Part 3 involves a person actually viewing the images, scrolling through the "nothing" times and producing a report or reports on the objects viewed. We will develop an experimental, Excel-based reporting template to facilitate this function. The template will have input slots for date, time, location, vessel activity, fish count by species.

Project Milestones

This project is designed to last eight months—from May 1, 2003 to December 31, 2003. Once the grant is awarded and the contract signed, Digital Observer will lease equipment to the project.

1. Beginning in May, Seattle-based systems architect Dean Smith will design and test a data acquisition system that will facilitate the efficient collection of data aboard ship and the efficient retrieval of those data ashore.
2. Also beginning in May, we will ship images collected by Digital Observer on previous Alaska commercial fishing cruises to Salmonsoft software engineer Zsolt Ari in Seattle. Ari will review the images and examine ways to modify his company's existing fish counting software for our purposes.
3. A few weeks later, we plan to hire a UAF student to be our summer field employee. That student will travel to Anchorage, where he/she will take a short course at the UAA North Pacific Fisheries Observer Training Center.
4. The student will then travel to Kodiak, to receive training in Digital Observer technology.
5. Once Smith has designed and tested the data acquisition system, both he and the student will travel to Dutch Harbor to assist a Digital Observer Principal Investigator in setting up the video monitoring system aboard the first of two ships. The volunteer boats are the 107-foot trawler *Alliance*, the 140-foot *Rebecca Irene*, and the 185-foot *Unimak* (not necessarily in that order). The system will consist of 4 cameras, some sensors, a GPS and a video recording device. Two of the cameras will be mounted on vessel masts. Two will be mounted on the ceiling inside the ship, or at such places designated by project staff for our research purposes. Assisted by vessel crewmen, we will run wires from the cameras and sensors to the recording device. That unit will be inside or near the boat's wheelhouse.
6. The student will remain in Dutch Harbor, going out on two boats for 2-week trips on each vessel. Our student will see to it that our systems are operating properly, and will help to set up and disassemble the systems on each vessel. The student will mostly stay in the wheelhouse and view a monitor that shows what the cameras are seeing. He/she will also control the image capture process and will set the digital video recorder to capture images in a variety resolutions and frame rates. If there is a malfunction, the student will be responsible to correct it, if possible. Additionally, if it develops that a camera angle is wrong, the student will be responsible to see that it is corrected. At selected times, primarily when lighting conditions are bad, the student will use a tripod-mounted Sony MiniDV 3 CCD video camera to film the same activities the stationary cameras are viewing. These images will later be used for comparison purposes, allowing us to ascertain whether the stationary cameras are doing as good a job as we had hoped.
7. On other occasions, the student will take the MiniDV camera out on deck to film the net dumping process. Because the MiniDV has a sound track, the student will be able to narrate events as they unfold. The student will film the fishermen returning prohibited species to the sea and will make note of the level of fish vitality. Those images will later be compared in a blind test with the images collected by the gantry cameras. Our

intent is to determine whether a viewer who has never been on the vessel can determine whether a fish is alive or dead merely by viewing images from the Gantry Cam.

8. The student will see to it that the images and other data that are collected are safely shipped to Kodiak when each vessel returns to port.
9. At the end of the two cruises, the student will travel to Kodiak with the equipment for de-briefing.
10. The student will stay in Kodiak for the remainder of the summer, viewing the images and writing a report of the cruises.
11. After the first shipment of data comes out of Dutch Harbor, we will ship the storage module to Zsolt Ari, the software engineer at Salmonsoft in Seattle. Ari will review the images and modify his company's existing fish counting software for our purposes. Salmonsoft is owned by Jeff Fryer, Ph.D., of Portland Oregon.
12. By the end of October 2003 we will have completed data gathering and preliminary analysis. At that time we will also present our six-month progress report to NPRB.
13. Digital Observer and Salmonsoft will compare the efficacy of viewing images collected aboard ship with no software interface and with Salmonsoft's interface, making note of software bugs and of time saved in viewing.
14. By December 31, 2003 we will have completed our final analysis and will submit our final report, including a short video.
15. In winter 2003 and spring of 2004 we will disseminate our information communicate with industry to discern the level of interest in deploying video monitoring systems on a more permanent basis aboard a broader range of vessels.

Mark K. Buckley
Box 649
Kodiak, Alaska 99615

(907) 486-4680
Fax 486-4684
email: mkbuckley@alaska.com

Thirty-five years' experience in Alaska, working primarily in positions relating to the commercial fishing/seafood industries. Most recent employment as a coordinator of high technology research related to Alaska's fisheries. Volunteer leadership positions in public broadcasting and hospital management.

PERTINENT EXPERIENCE

Digital Observer, LLC, Kodiak 1999-2003

Managing Partner

Conceived, planned and manages a $920,000, grant-funded research project that seeks to supplement, or in some cases replace, onboard fisheries observers on the world's longline fleets. Responsible for project coordination, grant writing and reporting, government interface, oversight of contractors and direct supervision of project employees.

Kodiak Daily Mirror, Kodiak 1989-92
1995-99

Staff Writer, columnist

Covered political issues plus fish business and marine science themes as they related to Central Gulf and Bering Sea communities. Routinely contacted political and industry leaders in Anchorage, Juneau, Seattle and Washington, D.C. Panelist in 1998 gubernatorial candidates' debate. Wrote weekly opinion column on fisheries-related issues. Submitted stories with Kodiak dateline to Associated Press. As a free lance journalist, contributed articles to: *Alaska Fisherman's Journal*, *Pacific Fishing Magazine*, and *National Fisherman.*

Buckley Fisheries, F/V Cameo II, Kodiak 1979-2001

Owner/Operator

Fished Bristol Bay first as a setnetter and then as a boat owner/permit holder/skipper. Participated in salmon, herring, halibut and other small-boat fisheries. Supervise crew of 2-3. When possible, retailed halibut and crab directly to Kodiak public. Processed and shipped crab to markets in Lower 48. As small business owner, handle own bookkeeping, reporting, etc.

Buckley Fisheries/ New Star Feeds, Kodiak 1992-95

Project Manager

Administered a project to turn seafood wastes and fishmeal into hatchery feed. Invented a revolutionary new feed that grew salmon fry and smolts more than 20 percent faster than the best feed on the market. This demonstration project resulted in improved fish waste processing technology and new markets for Kodiak fishery waste products. Conceived idea, wrote successful grants totaling $535,000, and administered project. Supervised staff of up to 15 laboratory technicians. Wrote quarterly financial and progress reports plus final report.

Peter Pan Seafoods, King Cove 1978-79

Beach Boss (Longshore Foreman)

Responsible for dock activities. Supervised 12-person crew.

Alaska Dept. of Fish and Game, 1972-78
Dutch Harbor, Trans Alaska Pipeline, Kodiak, King Cove

Fisheries Biologist, Habitat Biologist

Commercial fisheries research in Bering Sea and Alaska Peninsula fisheries. Cruise Leader in a Kodiak Island finfish survey. Spent 1975-77 as a habitat biologist on the northern section of the Trans Alaska pipeline.

EDUCATION

University of Alaska, Fairbanks campus

Bachelor of Science – Wildlife Management, 1972

University of Alaska, Fairbanks, Bristol Bay and Kodiak campuses

Several post graduate and undergraduate courses covering such topics as fisheries biology, small business administration and presentations, computers and office skills, 1974-95

PERSONAL

Affiliations and offices held

- Kodiak Public Broadcasting Corporation, Past President.
  Annual budget: $400,000. Staff: 8
- Providence Kodiak Island Medical Center, Hospital Advisory Board, 1997-present Chairman, 1999-2001
  Annual budget: $18 million. Staff: 160
- Providence Health System in Alaska, Board Member 1999-2001
  Annual budget, $485 million. Staff: 3,215
- Moderator, 2002 ComFish Gubernatorial Debate

Stosh Anderson
Box 310
3964 Cliffside Road
Kodiak, Alaska 99615
Phone 907 486 3673 stosh_a@hotmail.com

Achievement:
I have been involved in the Alaska fishing industry as an owner/operator for the past 27 years and as a deck hand prior to that. I have actively participated with industry organizations, regulatory boards, and forums addressing fisheries issues.

Industry and Public Service:
- North Pacific Fisheries Management Council, Member, present
- NPFMC Committees: EFH, GOA, Ecosystem, Member, present
- Kodiak Electrical Association, Director, present
- Alaska Commercial Fisheries and Agriculture Bank, Chairman, present
- State of Alaska Steller Sea Lion Stakeholders Work Group, past
- Kodiak Port and Harbor Advisory Board, present
- Alaska Oceans and Seas Fisheries Research Foundation, Director, past
- Kodiak Island Borough Aviation Advisory Board, Chairman, past
- Alaska Marine Conservation Council, Chairman, past
- Gulf of Alaska Non-Pelagic Trawl Task Force, past
- Naknek Kvichak Fish & Game Advisory Board, Chairman, past
- Bristol Bay Telephone Co-op, Director, past
- Levelock Electric Co-op, Chairman, past
- Bristol Bay Salmon Enhancement Association, Chairman, past
- Alaska Water Resource Board, past
- Alaska Water Quality Work Group, past
- Alaska Water Quality Advisory Group, past
- Fish & Game Southwest Regional Council, Co-Chairman, past

Business:
- Owner operator fishing vessels, 26 years, present
- Assist family setnet fish camps, 26 years, present
- Owner manager Aspen Co. investments, 32 years, present
- Digital Observer LLC , partner , present
- Maintenance Foreman, Valdez Pipeline Terminal for MK, past
- Commercial Pilot, SEL&S Instrument, glider
- A+ CompTIA Computer Service Technician

Personal:
- Married to Claudia Anderson since 1973
- Two sons, Kavik 25, Ty 23
- Came to Alaska in 1969 on an adventure and stayed
- University of Minnesota, 3 years
- Born 7 November 1946
- Racquetball, Volleyball enthusiast
- ACBL Bridge Club
- Sport Fishing and Hunting

Dean Smith dean_smith@econvene.net
System architect and Program Manager 206-818-1671

Education: B.S. Physics, Purdue University, W. Lafayette, Indiana
M.S. Engineering, The George Washington University, Washington, D.C.
Post graduate studies, National Cryptologic School, Ft. Meade, Md.

Experience: 20+ years designing, building and using many types of data collection systems – RF, telemetry, imagery, voice and others. I have worked with analog tape collection, digital systems, and many intelligence detection, compression and extraction systems. Many of those systems were designed to operate under adverse conditions such as on small naval vessels at sea.

Operation of all types of networked services – web systems, email, electronic publishing, forum systems, etc.

Project management of non-technical, technical and scientific teams numbering from 3 to 100. Management of diverse contractors and academic projects. Budgets from $50,000 to $15M.

Work History: 2000 – Present – Self employed system developer of Internet systems. Project manager for $1M church construction project.

1995 – 2000 – Network manager, Antioch University, Seattle, WA.

1992 – 1994 – Network manager, Herring-Newman, Seattle, WA.

1983 – 1992 – Chief Scientist for series of biomedical firms, Seattle area.

1979 – 1983 – Senior engineer with The Boeing Aerospace Co.

1964 – 1978 – Cryptologic mathematician and research scientist, National Security Agency, Ft. Meade, Md.

Personal: Boating, travel, Internet development, electronic and computer 'gadgets.'

Objective: I am interested in a project that can last at last 5 years until I am ready to retire.

Resume of:

Jeff Fryer
5810 SW Idaho Street
Portland, OR 97221-1628
Jeff.fryer@att.net

Work Experience:

Salmonsoft, 5810 SW Idaho Street, Portland, OR 97221-1628.

1998-present. One of two partners of Salmonsoft that produces software to improve the accuracy and decrease the time required to count fish at dams, weirs, and fish wheels. This software is currently used by the Michigan Department of Fish and Wildlife, Alaska Department of Fish and Game, U.S. Forest Service, Makah Indian Tribe, the U.S. Fish and Wildlife Service, Bering Sea Fisherman's Association, and the Yukon River Fish Wheel Operators.

Columbia River Inter-Tribal Fish Commission, 729 NE Oregon Street, Portland, OR. 97232.

1987-present. Member of the Fish Science Department since 1987. Duties have included leading CRITFC's stock identification project, coordinating a project to catch and tag 200,000 juvenile fall chinook on the Hanford Reach, developing life-cycle models of Columbia Basin salmon stocks, supervising adult fish sampling projects at Bonneville and upriver dams, and writing reports.

Mitre Corporation, Bedford, MA. 1979-1983. Member of technical staff modeling military communications systems.

Education

University of Washington. Seattle, Washington.

1995-Ph.D. (Fisheries)

University of New Brunswick, Fredericton, New Brunswick, Canada

1985-M.Sc. (Computer Science)
1979-B.Sc. (Computer Science) with the equivalent of an Honors in Statistics and a minor in Economics.

ZSOLT ARI

Email: jobsearch_000@hotmail.com

CAREER OBJECTIVE

Interested in a position related to GUI programming, and I would like to continue working on graphical applications. Coding for database applications also interest me as I have some experience with SQL.

COMPUTER SKILLS

I have extensive knowledge of the Windows operating system, with experience in Win32 and Windows APIs. I have over ten years of experience with C++ and have used Visual C++ with MFC for over eight years. I also have three years of experience using SQL, and one year of experience with C#. In addition, I have a working knowledge of several assembly languages, and various setup tools.

WORK EXPERIENCE

SOFTWARE ENGINEER **February 1999 - Present**
Salmonsoft, Portland, OR

- Ongoing development of a fish-counting software, using C++, MFC, and Win32 APIs, that captures video signal from a VCR or video camera, and attempts to record frames where fish are present. The second part of the software bundle plays back frames that were captured with the first software, and allows an end user to classify the type of fish in the video by recording user inputs in an Excel worksheet using COM.

SOFTWARE ENGINEER **August 2001 – August 2002**
Microsoft Corporation, Redmond, WA **November 1995 – June 1999**

- Most recent assignment was a prototype development of an annotation application using C#. Also helped fixing bugs at eBooks, a GUI application using C++ and Win32 APIs.
- Previous assignment, lasting over a span of three years, required the development of a GUI for a photo-editing suite in C++ and MFC. Fully responsible for various sections of the software, including several portions of the GUI and the underlying support for the GUI, core help within the product. For two years, developed the setup engine.
- Other past assignments included development of test scripts to test secure communication over the World Wide Web for Internet Explorer; and development of a voice-based telephony project, where I was partially responsible for core component of the software.

SOFTWARE ENGINEER **January 2000 – September 2000**
Meuret Consulting, Seattle, WA

- GUI programming in C++ and Win32, for serial file transfer either real-time or on a schedule.
- GUI programming for a photo-editing suite in C++ including an image cataloging feature using COM.

SOFTWARE ENGINEER **August 1992 – November 1995**
Satori Software, Seattle, WA

- Developed bulk mailer application using Visual C++ and MFC. Developed GUI and CD-ROM to add four-digit extension to ZIP codes. Responsibilities included system analysis on new projects to be developed and maintenance of same project over several project cycles.
- More recently, supervised another employee.

EDUCATION

Seattle University, Seattle, WA
Bachelor of Science, Computer Science June 1992
Bachelor of Science, Electrical Engineering June 1992
Minor in Mathematics and in Physics

Possible Peer Reviewers

Joe Chaszar
Observer Training Specialist
University of Alaska Anchorage Fisheries Observer Training Center
707 A St., Suite 207
Anchorage, AK 99501
907 257 2779
anjmc@uaa.alaska.edu

Heather McCarty
McCarty and Associates
319 Seward St. #3
Juneau, AK 99801
907 586 4260
rising@ptialaska.net

North Pacific Groundfish Observer Program
C/O Richard Marasco Ph.D.
Division Director REFM, AFSC
NOAA Fisheries
7600 Sand Point Way NE
Seattle, WA 98115
206 526 4172
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NPRB BUDGET SUMMARY FORM

PROJECT TITLE:
Video Monitoring Aboard Bering Sea Factory Trawlers—a Pilot Study

PRINCIPAL INVESTIGATOR:
Mark K. Buckley

FUNDING SOURCE	YEAR 1	TOTAL
NPRB Funding	165,000.00	165,000.00
Match/In Kind	280,000.00	280,000.00
TOTAL	445,000.00	445,000.00

Cost Categories	NPRB Year 1	NPRB TOTAL	Match/In kind TOTAL (all years)
1. Personnel Salaries	43,887.00	43,887.00	
2. Personnel Fringe Benefits	9,177.00	9,177.00	
3. Travel (include 1 trip to review meeting in Anchorage)	18,762.00	18,762.00	
4. Equipment Rent	21,174.00	21,174.00	
5. Supplies	1,000.00	1,000.00	
6. Contractual/Consultants	69,500.00	69,500.00	280,000.00
7. Other (Include $1500 for education and outreach)	1,500.00	1,500.00	
Total Direct Costs	162,859.00	162,859.00	0
Indirect Costs	0	0	
TOTAL PROJECT COSTS	165,000.00	165,000.00	280,000.00

Budget Narrative

Unless otherwise noted, all costs discussed below will be paid by NPRB.

Equipment

The Equipment inventory can be seen on Page 17 of the Line Item Budget. Every piece of this equipment will be deployed aboard the two trawl vessels. Digital Observer will own the equipment and lease it to the project. The cost of the lease reflects the depreciation risk due to damage or loss. Installing and removing each piece of electronic equipment on each vessel will mean six trips on or off the vessels in as many weeks plus shipment to and from Dutch.

The system will consist of four cameras: two in rugged, "Alaskanized" outdoor housings that will be suitable to withstand the rigors of Bering Sea weather and two in ceiling-mounted dome units that will be positioned in the factory. The two outdoor cameras will be contributed as in-kind support by Digital Observer. The digital video recorder and its attendant accessories will be placed inside a rugged steel box.

Extra to the system will be a Sony MiniDV camera that our technician will use to record and later verify the same scenes captured by our stationary cameras.

Supplies

Self explanatory on Page 17. Expendables related to installing the cameras.

Contract Services

- Installation fees. We will ask technicians at Harris Electric in Dutch Harbor to assist us as we install and remove the devices from the ships. Because we will need crew assistance installing the devices, and because these installs will represent extra duties for the crew who might otherwise enjoy some shore time during the vessel's typical 36-hour turnaround, we feel it is only fair to pay our helpers. We are budgeting a total of $3,000 to pay fishermen for their assistance. This also includes compensating them for any assistance they render to the project while they are at sea.
- Seattle software architect Dean Smith will design, test and set up the shipboard data collection system for $15,000.
- We will contract with the software designers at Salmonsoft, based in Portland, Oregon, to design an experimental system that virtually compresses time through the use of machine vision. If Salmonsoft is successful (and, having seen their software in action we believe they will be) then we will use their system to facilitate analysis of the images collected aboard ship.
- Szabo Office Services of Kodiak will be our bookkeeping company for $400.
- Aksala Electronics of Kodiak will install automatic wiper systems in our two outdoor camera housings.
- Two trawl vessels will carry our equipment and technician for up to two weeks per vessel. Officials at the Kodiak Fish Company and at Iquique U.S. inform us that it costs $10,000 per day to operate both the F/V *Alliance* and the *Rebecca Irene* and $13,000 per day to operate the Unimak in the Bering Sea. Based on these numbers. We are assigning a total of $280,000 an in-kind support to the project.

Education and Interpretation

We will produce a short, web-ready motion picture and make the motion picture available on videotape and DVD. We will produce a Power Point presentation will give presentations at appropriate forums always mentioning NPRB support.

Travel/Per Diem

Please refer to the Travel lines on Page 18. We plan to hire a UAF fisheries student for a summer job. Project personnel will need to travel to Fairbanks to interview applicants. Work will be in Anchorage, Kodiak, Dutch Harbor, and aboard ship in the Bering Sea. We will be responsible to feed, transport and house this temporary employee. We will transport him or her to Anchorage for 10 days' training. Next the student will come to Kodiak for introduction to the equipment. We will house the student here in an apartment set aside for visiting scientists.

Much of our travel money will be spent in airfares to Dutch Harbor. Project personnel will need to travel there to assist during installs. It is critical that we install the equipment precisely and make sure it is working properly during the short time frame the vessel is turning around in port. Because no one has ever done this before, we will have a steep learning curve as to what works and what does not.

Salaries & Benefits

Salaries and benefits are outlined on Page 19. Benefits do not exceed 25% of salaries. The project will offer part-time employment to three Digital Observer employees.

Indirect Costs

Digital Observer will charge no indirect costs to the NPRB for this project.