Other Activities

1. CSA Small Payloads Proposal (*NiteOwl*)

Experiment:

- Stellar occultation experiment to measure ozone using Chappuis-band absorption along near-horizontal sight lines through stratosphere and upper troposphere;

- Slitless imaging spectrograph: low dispersion, 15° field of view, CCD detector ➪ 100:1 SNR for 3rd-magnitude stars;

- Rocket-launched, parachute-borne, absolute position and orientation determined with GPS and attitude video camera;

- Spectral inversion ➪ species column concentrations; tomographic inversion ➪ 3-d species distribution: $[O_3]$, [M], possibly $[NO_2]$, $[NO_3]$

Submission Team:

- Highly qualified faculty and graduate students, senior personnel from industrial partner: science, engineering, **and management** expertise;

- Students participated through graduate course; pass contingent on compliant submission on time (like the "real world");

- Student marks determined by quantity and quality of contributions to proposal, written and otherwise;

- MBA students invited, to prepare all management aspects including management plan;

- Industrial partner personnel worked closely with University personnel;

Concept development:

- Working groups, led by faculty, but students did much of the work;
- First, important questions; then find / estimate / calculate answers;
- Trade-offs:
  - ★ Tomographic accuracy / number of launches / cost and complexity;
  - ★ Chute time / battery life / prevailing winds / payload recovery;
  - ★ Sensitivity / field-of-view / target density / detector size;
  - ★ Spectral resolution / aurora / data volume;
- External input: Bristol, Akjuit; trip to Winnipeg in a blizzard;

Proposal development:

- Plenary meetings, working group meetings, project Web site;
- Students responsible for writing; weekend writing blitzes in late November to finish first draft;
- Editing team added, revised, polished, proofread;
- P.I. ultimately responsible for proposal submitted;

Future:

- Phase A: graduate (and undergraduate?) students working with faculty advisors and SCI-TEC personnel;

- Support graduate students with targetted scholarships funded by contract overhead;

- Phase B: experiment implemented, built, tested at SCI-TEC by their staff **plus** graduate students working as term employees;

- Phase C: Bristol with SCI-TEC/U. of Sask. participation;

- Phase D: Akjuit with Bristol/SCI-TEC/U. of Sask. participation;

- Phase E: Bristol;

- Beyond: microsat experiment to monitor global ozone, commercial data product development?

Other Activities

2. Polar Camera Refurbishment, Repair, and Recalibration

- Problems: image defects, non-operating filter wheel;

ISAS, Saskatoon:

- Replaced mechanical relay actuating filter wheel motor
- Solved communication problems (poorly seated ICs!)
- Sensitivity calibration before detector system repair

Photometrics, Inc., Tucson:

- Detector preventive maintenance: pump and bake CCD housing (several times), TEC test, recalibration (quantization, dark current, electronic gain, linearity);
- Trouble-shooting: changed jumper settings(!), repaired bad circuit traces;

ISAS, Saskatoon:

- Interference filters: complete transmission band measurements inside camera system (passbands, absolute transmissions agree closely with measurements from 1992-1993);
- Sensitivity calibration before redeployment to Eureka;
- Moonshades removed this winter to expand field of view toward Resolute Bay for tomography studies;

Future Plans

- Hiring summer student (using research grant) to help with Polar Camera data reduction and analysis;
- Completion, testing, and implementation of OH temperature algorithm;
- Submission of manuscript on Dec. 1994 OH study;
- Further contribution to polar arc tomography with R.A. Doe;
- Continued contribution to P. Prikryl's study on patch formation;
- Submission of manuscript on Single-Point Auroral Stereoscopy;
- Try to write Polar Camera instrument paper, and manuals on Polar Camera operations, and data analysis software;

Concluding Remarks

I am grateful for the CSA's support under the CNSR-Transition Award program over the past year.

I am pleased with my contribution to the *NiteOwl* proposal, with having gotten the Polar Camera back in working order, and with having tackled the interpretation of images in terms of OH temperatures. However, I regret my continuing low level of *scientific* productivity.

I continued to struggle this year, as in years past, with striking the right balance between Polar Camera *operations* and *science*. For several months I failed to recognize the need to use NSERC funds to buy some help with the operations side, instead trying to save them for support of a graduate student I made no effort to recruit.

These specific issues are symptomatic of deeper, personal problems with time management, priorization, planning, and assertiveness. I have begun to get help to deal with these personal problems, through the University of Saskatchewan's Employee Assistance Program, and am hopeful for ultimate growth in these areas. However, I do not know how long it will take to complete the radical changes that are required.

Concluding Remarks (cont.)

I would like to ask the CSA for partial support for the final year of the CNSR-Transition Award program. I would be grateful for a period of six to eight months in which to try to wrap up my activities with the Polar Camera operations and science, to explore all possible avenues for scientific, industrial, or teaching work in Saskatoon, and to begin to try to overcome the personal problems that have compromised my effectiveness as a scientist.

I would like to spend the next several months completing the Polar Camera projects I outlined earlier, which are efforts already begun.

Despite the positive outcome of the *NiteOwl* proposal preparation, I have some doubts about my readiness to undertake responsibility for the execution of the actual project. I would feel more confident of its success (for which I have great hope!) with a proven and productive scientist as Principal Investigator.