

- 1963: Studies in the physiological ecology of *Populus tremuloides* in the Laramie Mountains of Southeastern Wyoming (with B. R. Strain). Ecology 44:581-584. Infrared detection of heat sources obscured by rain forest vegetation (U) (with J. N. Rinker, T. C. Vogel, J. O. Morgan, and D. C. Parker). USA CRREL Res. Rpt. 149 (Confidential).
- 1964: The application of multiband aerial sensing to problems in plant ecology. Tenth Internat. Bot. Congress, Edinburgh, Scotland. Illustrated summary of the geology of the Yukon Flats (with F. P. Heinsohn, and A. O. Poulin). USA CRREL, Tech. Rpt. 154, 27 p.
- 1964: Report on Phase I. Development of photo analysis methods for factor map criteria and first approximation map overlays (with R. D. Leighty, V. H. Anderson, A. O. Poulin and R. E. Frost). USA CRREL (unpublished report, 56 p.). Report on Phase II. Field verification and preparation of revised factor maps (with R. D. Leighty, V. H. Anderson, A. O. Poulin, and R. E. Frost). USA CRREL. (First and second report in a series of three on the Program "Development and Application of Airphoto Methods to Obtain Mobility Information in Thailand," (unpublished report, 700 p.).
- 1965: Pede-ecological investigations, Barrow, Alaska (with J. Brown). USA CRREL, Tech. Rpt. 159, 37 p. Monitoring radioactive contamination to vegetation with aerial photography, Photogrammetric Engr., 31:984-990. Canopy closure index by an optical density method (with T. C. Vogel). USA CRREL, Tech. Note, 16 p. Investigation of sugar cane vigor with aerial photography in Puerto Rico. USA CRREL, Special Rpt. 93, 38 p. Review of vegetation and soils, a world picture by S. R. Eyre. Economic Botanay 19:438-439. Evaluation of an economical instrument shelter for microclimatological studies (with T. C. Vogel). For. Sci. 11:434-435.
- 1966: Selected air-photo patterns of terrain features (with R. E. Frost, R. D. Leighty, V. H. Anderson, A. O. Poulin, and J. N. Rinker). In *Mobility environmental research study for describing terrain for ground mobility*. Vol. 6, 327 p. The eye and the photograph, an entropy model. USA CRREL, Tech. Note, 6 p. U.S. Army CRREL Topographic Map, Barrow, Alaska (with J. Brown). USA CRREL Special Report 101 (in press). Vegetation of the Yukon Flats Region, Alaska (with T. C. Vogel). USA CRREL Research Report 209 (in press). A chemically stratified lake in Alaska (with G. E. Likens). Science 153:875-877. Aerial sensing and photographic study of the El Verde Forest, Puerto Rico (with D. A. Atwood). In *A Rain Forest*, (an intensive gamma radiation experiment in a tropical ecosystem). AEC (in press). Educational needs for remote sensing in ecology. Proc. Fourth Symposium on Remote Sensing of Environment, Ann Arbor, Michigan, 719-726. Application of remote sensing of ecological problems. Proc. International Symposium on Ecology of Subarctic Regions, Helsinki, (UNESCO, in press).

PROPOSED BUDGET—3 YEARS

	1st year	2d year	3d year
Salaries and wages:			
Principal investigator (program director)			
Research associate (program coordinator)			
Secretarial services	\$15,000	\$15,750	\$16,540
Staff benefits	6,000	6,000	6,000
	2,520	2,610	2,705
Total salaries and wages	23,520	24,360	25,245
Indirect costs: 45 percent of salaries and wages	10,585	10,960	11,360
Site visits and other travel	8,000	2,000	2,000
Computer time		1,000	1,000
Publication costs	200	200	200
Total amount requested from NSF	42,305	38,520	39,805
Total, 3 years		120,630	