COMMISSION OF THE EUROPEAN COMMUNITIES

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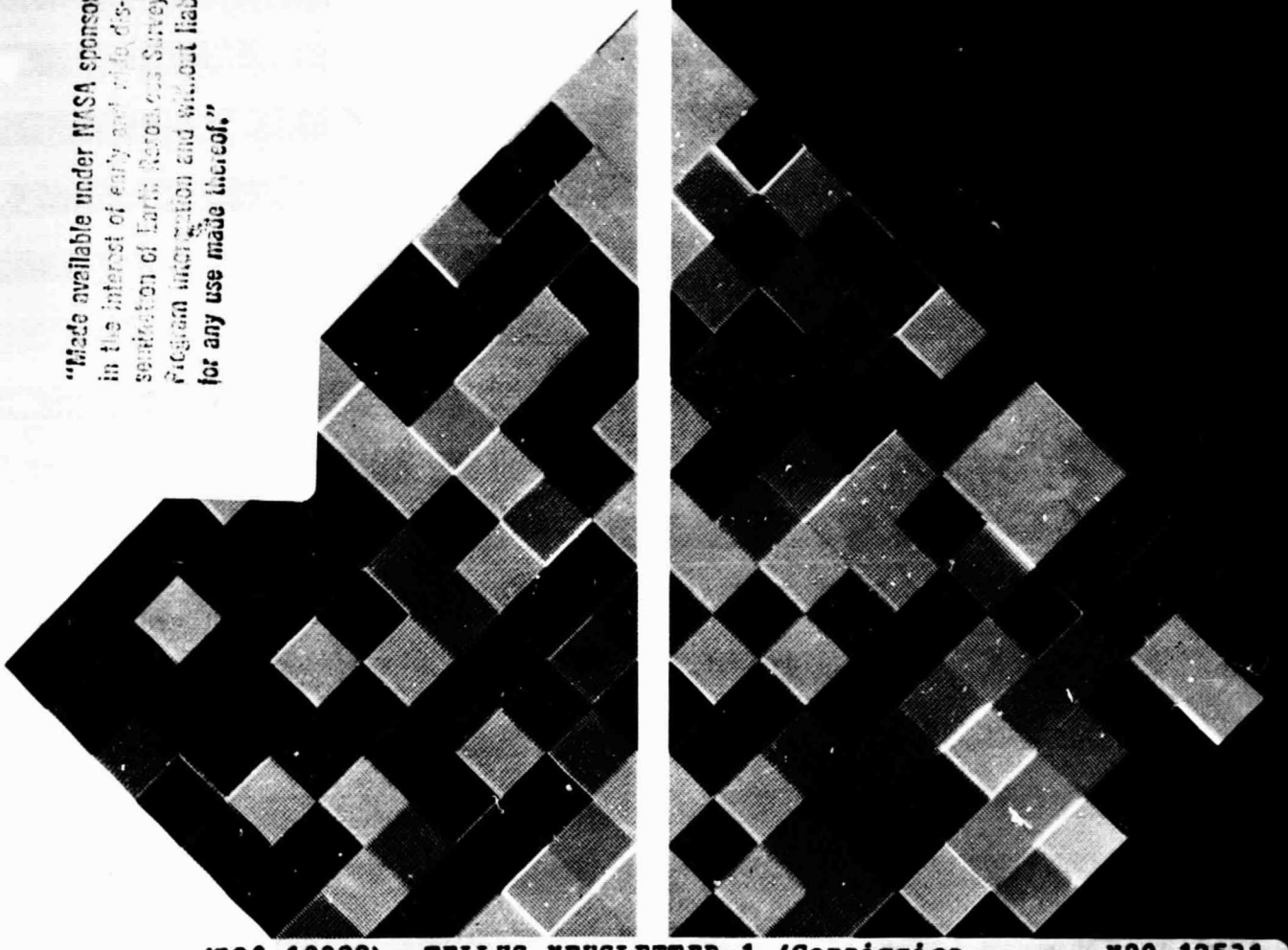

TELLUS PROJECT

Dear Colleague,

A lot, too much, paper is being produced and printed and it is hard to keep up with all the information available. Much of this information is also redundant and adds only little or nothing new to the growth of science. But printed paper is also the proof that work has been done and the most successful experiment does simply not exist if its results have not been fixed on paper.

The Tellus Project is both multi-disciplinary and multi-national. By publishing this newsletter at irregular intervals we shall try to disseminate results and new developments in the project as quickly as possible, for the cohesion of the project and the profit of all the participants. At the same time we intend to keep the amount of paper to a strict minimum.

Please, help us in this task by sending your contributions, your suggestions and your criticism.

The cover of the newsletter represents an unsmoothed HCMM simulation of part of the Bretagne test site. The color-coded thermal image taken during the 1977 campaign was kindly made available by Ch. Goillot and P. Boissard, Laboratoire de Télédétection INRA-INA, Versailles.

At the same time I have to apologize for the delay in the publication due to the preparation and printing of this cover.

Like the cover picture, the contents of the first number is a contribution of the Laboratoire de Télédétection, INRA-INA, Versailles. It presents a simulation of HCMM resolution from airborne thermal scanner data obtained during the Joint Flight Experiment France. 1977.

A similar simulation program is available at the Computer Center of JRC, Ispra and the characteristics of the two programs were discussed this July during a visit of Mr. Boissard to the JRC. Those of you interested in applying the simulation program should directly contact Mr. Boissard, INRA-INA, or Mr. Mégier at the JRC. Working Group III Data Handling, will certainly also treat the subject.

Sincerely,

P. Reiniger

P. Reiniger

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PROGRAMME TELLUS

RÉPUBLIQUE FRANÇAISE
MINISTERE DE L'AGRICULTURE

Laboratoire de Télédétection de l'I.N.R.A. - I.N.A.

Route de St Cyr 78000 VERSAILLES

J. F. E. 1er septembre 1977 Beauce (France)

Simulation de données H.C.M.M. à partir des données acquises par scanner aéroporté sur une partie du site test

Simulation of H.C.M.M. data from J.F.E. airborne scanner data on a sample of the test site

Importante remarque préliminaire :

Une note technique est en cours sur ce sujet : les documents présents doivent être considérés comme provisoires. Ils sont diffusés dans le but de faire circuler rapidement, auprès des co-investigateurs du programme TELLUS, une information concernant les problèmes que pose l'interprétation de pixels de 500 x 500m, sur la carte thermique d'une scène hétérogène.

Preliminary important remark :

A paper about this topic is on the way : the present documents are to be considered only as a provisional information released for a "quick information" to TELLUS Co Is on the problems arising from the interpretation of 500 x 500m pixels, on the thermal map of an heterogenious scene.

FOLDOUT FRAME 1

Fig. 1

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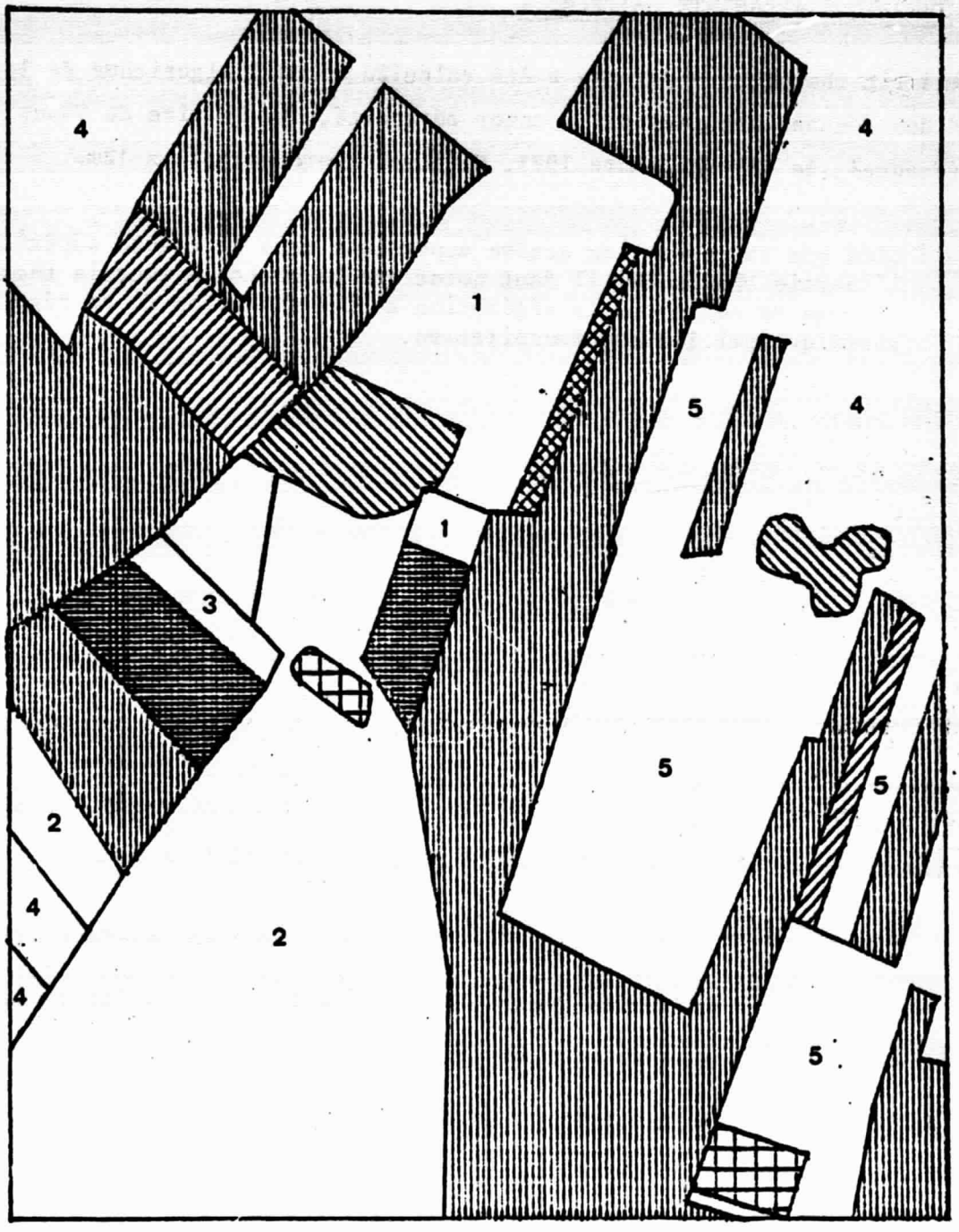
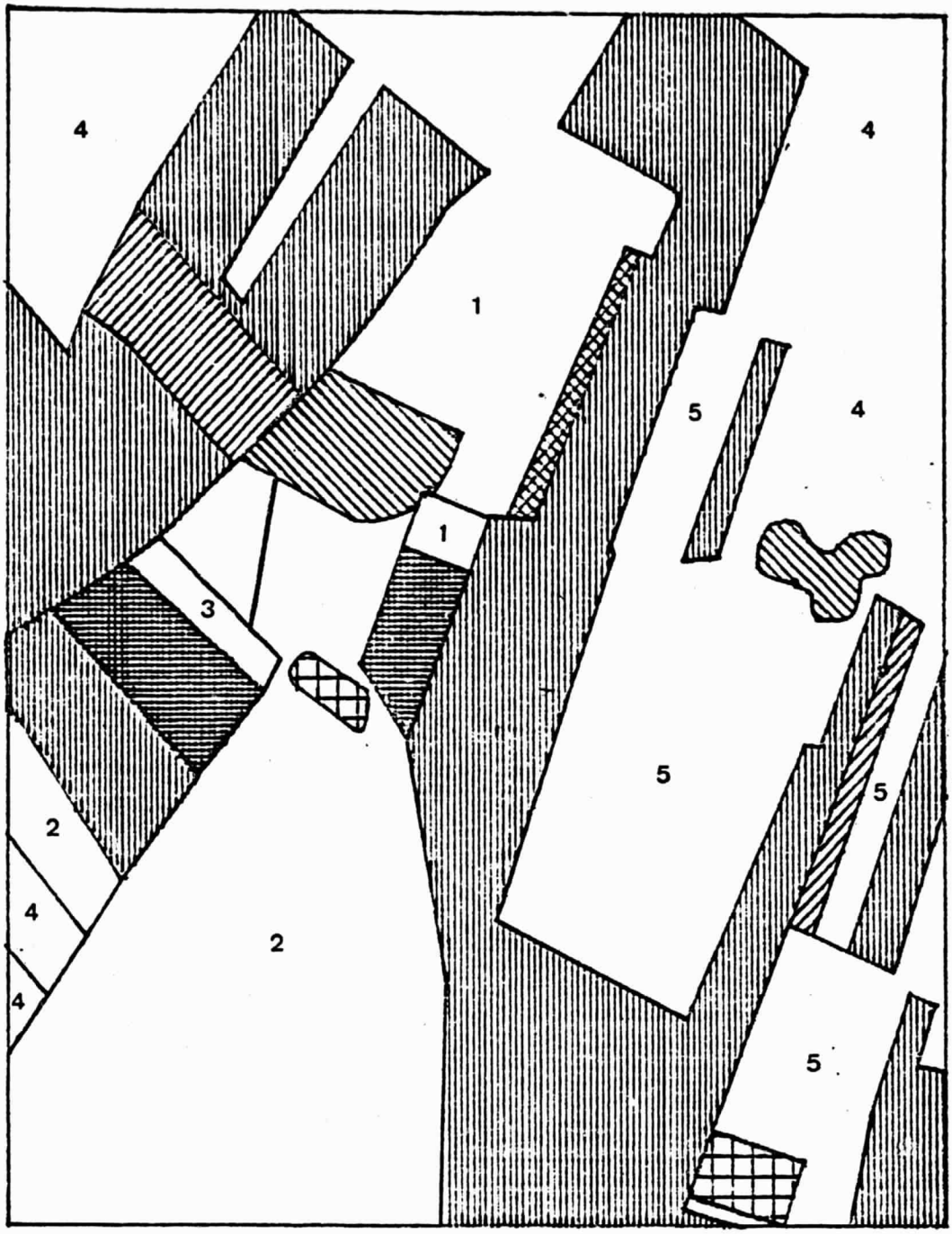
OCCUPATION DU SOL - *LAND USE*

Echelle 1/5000 environ - *Scale ~ 1/5000*



Echelle 1/5000 environ – *Scale ~ 1/5000*



1 Chaume – *Stubble*

2 Chaume labouré – *Ploughed stubble*

3 Chaume roulé – *Rolled stubble*

4 Labours – *Ploughed fields*

5 Labours roulés – *Ploughed and rolled soils.*

Maïs – *Maize*

Colza – *Colza*

Betteraves – *Beets*

Village, Batiments – *Village, Buildings*

Haricots – *Beans*

Bois – *Woods*

FOLDOUT FRAME 2

INERTIE THERMIQUE APPARENTE - Fig. 2

L'inertie thermique apparente a été calculée selon l'algorithme de la N.A.S.A. à partir des données acquises par scanner aéroporté, sur le site de Voves, en Beauce (France), le 1er septembre 1977. Un pixel représente 12 x 12m.

Remarque+ : Bien que la végétation active apparaisse dans la classe supérieure de l'inertie thermique, il faut noter que la notion d'inertie thermique n'a pas de sens pour la végétation active en raison de sa régulation thermique par l'évapotranspiration.

APPARENT THERMAL INERTIA - Fig 2

Apparent thermal inertia had been computed according to the N.A.S.A.'s algorithm from the data registered by airborne scanner above Voves test site, in Beauce (France), on September 1st 1977. A pixel represents 12 x 12m.

Note+ : Although surfaces of active vegetation come in the upper class of thermal inertia, it must be kept in mind that the concept of thermal inertia is meaningless for active vegetation due to its thermal regulation by evapotranspiration.

INERTIE THERMIQUE APPARENTE

Fig 2

BOLTDOUT FRAME 1

APPARENT THERMAL INERTIA

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$$P = C \frac{1 - \frac{\Phi}{\Phi_o}}{\Delta T} \qquad W \cdot sec^{1/2} \cdot m^{-2} \cdot {}^\circ K^{-1}$$

$$P = C \frac{1 - \frac{\Phi_o}{}}{\Delta T} \qquad W \cdot sec^{1/2} \cdot m^{-2} \cdot °K^{-1}$$

Végétation active. *Active vegetation* = 0,027 C✦

Village - Limites. *Village - Boundaries* = 0,023 C

Sol nu - Chaume. *Bare soil - Stubbles* = 0,018 C

✦ *See Note in the text.*

FOLDOUT FRAME 2

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SIMULATION DE L'INERTIE THERMIQUE APPARENTE - Fig. 3

On a obtenu cette carte de l'inertie thermique apparente (pixel 500 x 500 m) de type H.C.M.M. (mission thermographique du satellite EXPLORER) en appliquant un algorithme de simulation à l'inertie thermique apparente de la Fig. 2, (pixel : 12 x 12 m).

Les classes de couleurs résultent d'un découpage linéaire de la gamme des inerties.

On constate un regroupement des pixels en fonction de la dominante - sol nu ou végétation active - et un déplacement général des valeurs vers la moyenne.

Cette simulation montre comment est perdue l'information d'hétérogénéité. Néanmoins, il résulte de la comparaison des fig. 2 et 3 que les grandes masses sont mises en évidence.

APPARENT THERMAL INERTIA SIMULATION - Fig. 3

The data of fig. 2 (12 x 12 m pixel) have been computed by mean of our simulation algorithm thus bringing forth the fig. 3. This one is a thermal inertia map as it can be excepted from H.C.M.M. of EXPLORER (500 x 500 m pixel).

The thermal inertia range has been cut into 5 colour-coded classes, the thermal inertia being epaul for each class.

It's shown that depending on how predominant is one of the two actual main classes - bare siol or active vegetation - :

- *the pixels clustes together,*
- *the levels shift towards the mean level of the scene.*

This simulation shows how the spatial information concerning heterogeneity is lost. Nethertheless, it arises from the comparison of fig. 2 and 3 that the most significant features of the scene are preserved.

FOLDOUT FRAME 1

SIMULATION DE L'INERTIE THERMIQUE APPARENTE

APPARENT THERMAL INERTIA SIMULATION

Fig 3

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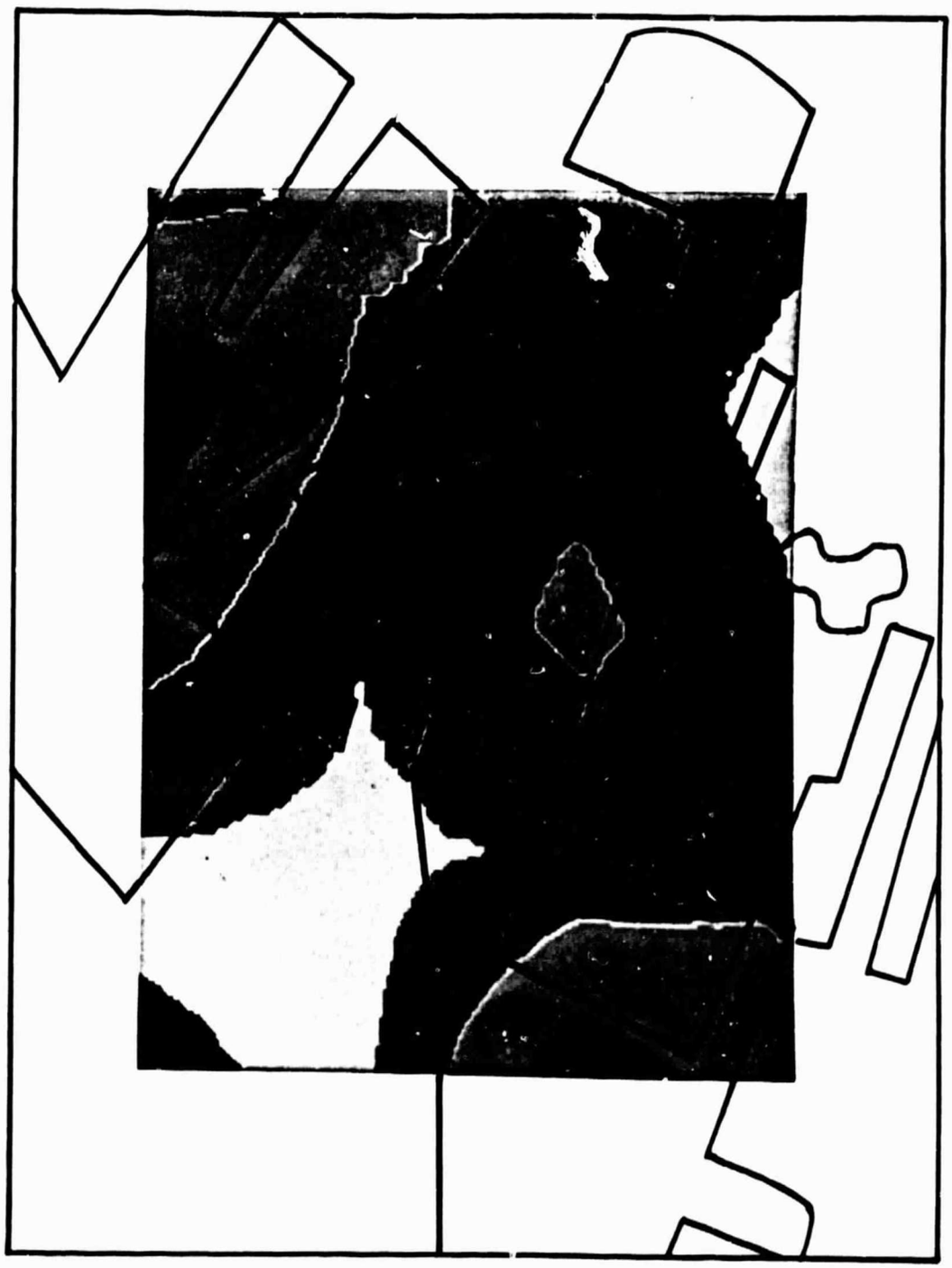

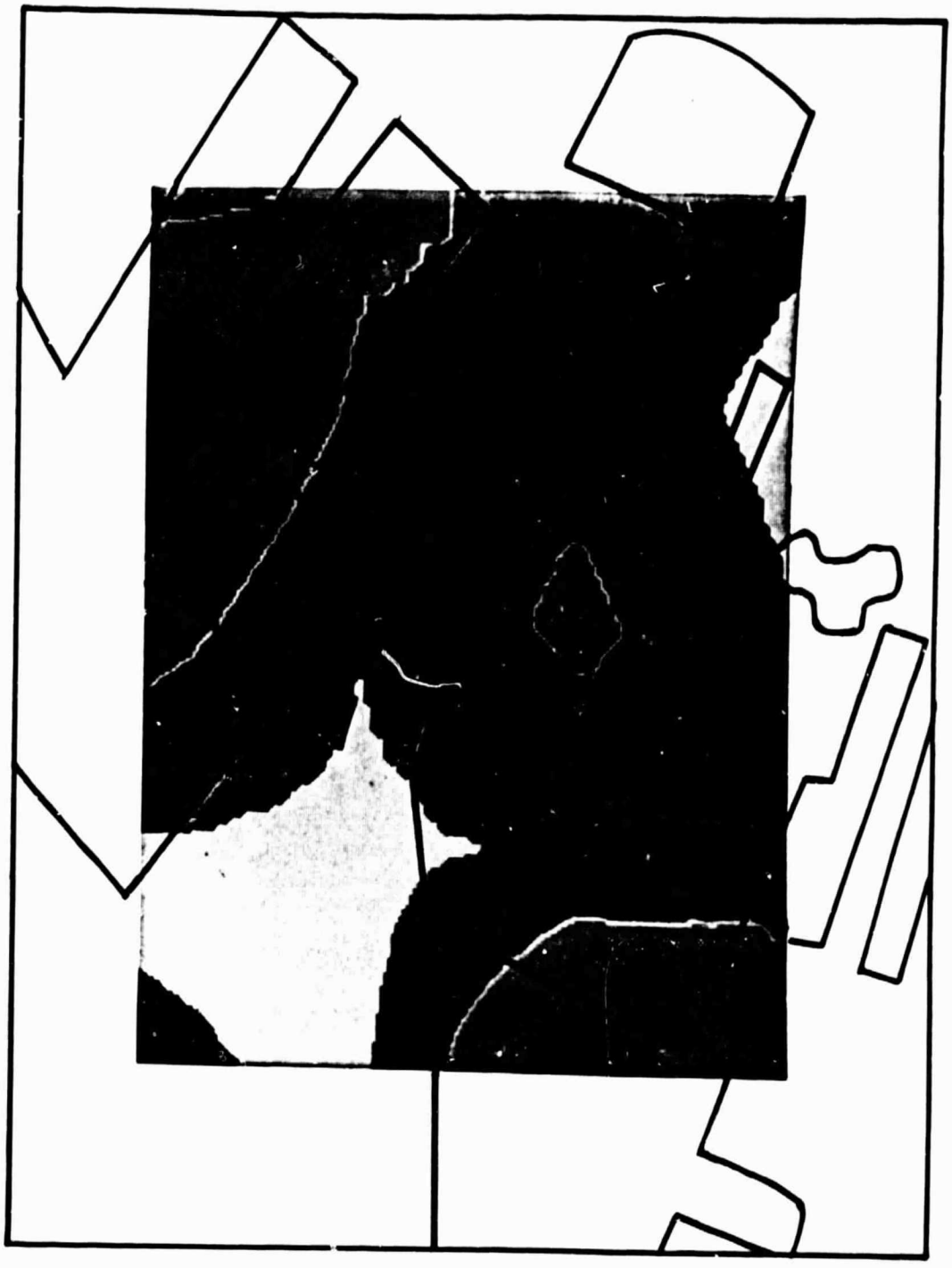

0,026 C

0,0245 C

0,023 C

0,0215 C

0,020 C

FOLDOUT FRAME 2