

THE USE OF UNMANNED AERIAL VEHICLE TO SURVEY AND MONITOR THE SITUATION OF NARCOTIC CROPS IN THAILAND

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ABSTRACT: Narcotic Crops Survey and Monitoring Institute (NCSMI), Office of the Narcotics Control Board (ONCB) applied and integrated fundamental methodologies of aerial and ground survey for narcotic crops with modern technologies of Remote Sensing techniques in supporting opium fields interpretation with topographic maps and GPS included equipment and other tools concerned to survey punctual positions of opium fields.

The goal of this mission was to destroy the narcotic crops by producing opium eradication maps and supporting the Third Army Area-RTA, The Border Patrol Police Region 3, Royal Thai Police Aviation Division and also the Provincial/District Operation Centers for Combating Drugs to reach target areas and eradicate opium fields before harvesting by farmers. The present situation of opium cultivation has changed because farmers learned eradication patterns and adapted cultivation styles for keeping their opium fields surviving. The most important thing was risk of dangers which could occur with survey staffs anytime because of the difficulty to reach opium poppy fields. Therefore, the use of Unmanned Aerial Vehicle (UAV) was applied to survey and monitor the situation of narcotic crops. The help function utilized in conjunction with ground survey of narcotic crops and support / enhance the aerial survey. Other mission-related goals patrol noticed to monitor the situation / residential / personal / weapons / vehicles related to the narcotic crops and drugs. In the effectively area, it can provide raster data which details are good, accurate positioning target coordinates. It is aerial photography mosaic. All data will be imported and analyzed in GIS software to produce thematic maps of narcotic crops. More over, survey staffs can easily produce rapid maps and send to eradication teams in urgent situation as well. Finally the functional systems of UAV is very useful of benefit other organizations which lead the country into further development.

INTRODUCTION

1. OPIUM POPPY CULTIVATION AND ERADICATION IN THAILAND

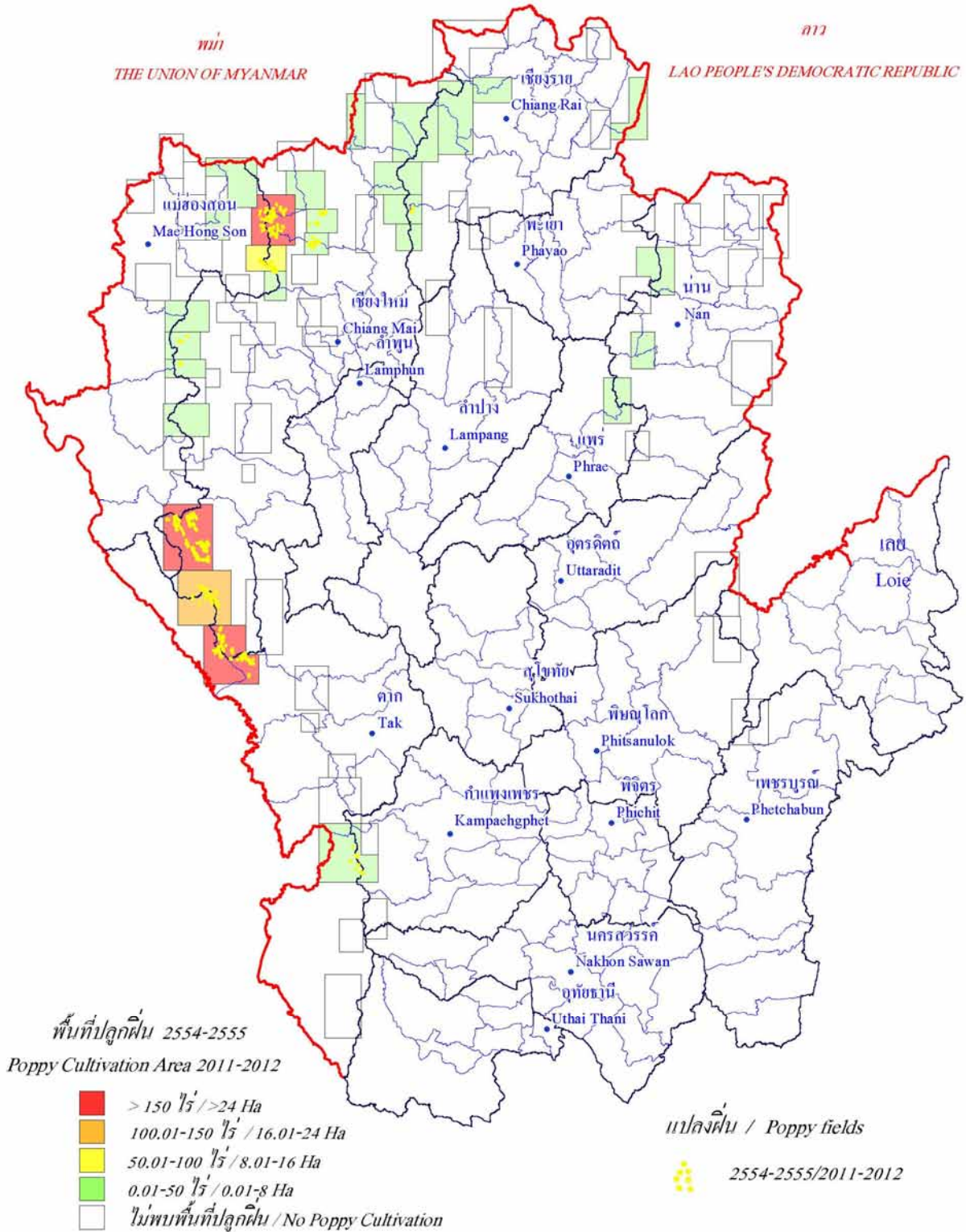
The unofficial of opium poppy cultivation survey in Thailand started in 1973 by the Department of Forestry and Department of Public Welfare which could not collect the number of opium poppy field at that time. There were estimated 20,000 hectares of opium poppy fields. In 1979, Office of the Narcotics Control Board (ONCB) assigned that the official opium poppy cultivation survey and monitoring operation was one of the important of ONCB missions which operated by the Cooperating and Verifying Division (later was under the Narcotic Crops Control Division, Northern Narcotics Control Office, until now is the Narcotic Crops Survey and Monitoring Institute or NCSMI).

The opium poppy cultivation survey was covered the northern and northeast part of Thailand by using modern tools and equipments (at that moment) such as magnetic compasses, topographic maps and binoculars. Fortunately, the Narcotic Crops Unit (NCU) of the United States Embassy in Thailand which became aware of the problems and effects of the opium poppy cultivation in Thailand, supported the technology of aerial photo for the mission of the opium poppy cultivation aerial survey such as aerial photos, the lightening table for aerial photo interpretation, and airplanes for aerial photo operation which were very expensive. By these supports, the opium poppy cultivation both ground and survey methodologies could sum up that there were 8,776.64 hectares of opium cultivation areas cover the northern and the northeastern part of Thailand in 1984 and also defined that there were 76 potential areas where were suitable for opium poppy cultivations (76 highland units) till present. In addition, by the study of the suitable location for opium poppy cultivation in Thailand were : cultivated by 800 meters from sea level, cool climate with highly humid and also highly rich soil.

Due to the first era of the opium poppy cultivation survey, there were many obstacles and problems in ground and aerial surveys. First, staffs lacked experiences in using many high technologies of tools and equipments especially an aerial photo recording and interpreting. In addition, staffs must practice in observation and remembering of opium cultivation, areas characteristics, hilltribe villages and also the flight path for preparing and managing in geographic database. Furthermore, this mission was the most risk for life and state properties.

The opium eradication started in the same period by the corporation of the Royal Thai Army, the Royal Thai Border Petrol Police. In this same period, many highland development projects came to join the mission by developing and promoting the crop replacement and the quality of life to all hilltribe people. With all good corporations from many bureaus and the efficiency of opium cultivation survey by ONCB, problems of opium cultivation were solved and made their lives be better.

Map : Opium Poppy fields in 76 Highland Units in Northern Thailand (2011-2012)



2. UAV operation of Narcotic Crops Survey and Monitoring Institute or NCSMI

NCSMI applied Unmanned Aerial Vehicle (UAV) to support narcotic crops survey, especially in ground survey. In addition, it also aims to develop the knowledge and survey of narcotic crops nowadays. In 2011, NCSMI started from fundamental of UAV functions, missions and photo taken from UAV. Furthermore, UAV pilots also developed many skills concerned and now they are in high level of experiences and ready to operate UAV in their missions.

The satisfied results of the study was that the people of NCSMI got knowledges and skills in the use of UAV in the initial exploration well. All data concerned can be obtained from UAV system technology applied to the development of the data. Furthermore, UAV missions can also be applied in following drugs situations in high risk and dangerous areas to save human's life.

3. Methodology

Phase I The use of UAV radio control technology to survey and monitor the situation of narcotic crops. Radio Control personnel control the motion of the glider.



Figure 1: Aerial photo taken by UAV during ground opium poppy survey mission at ChiangDao district, ChiangMai province

Phase II The application of an automated UAV to survey and monitor the situation of narcotic crops cultivation

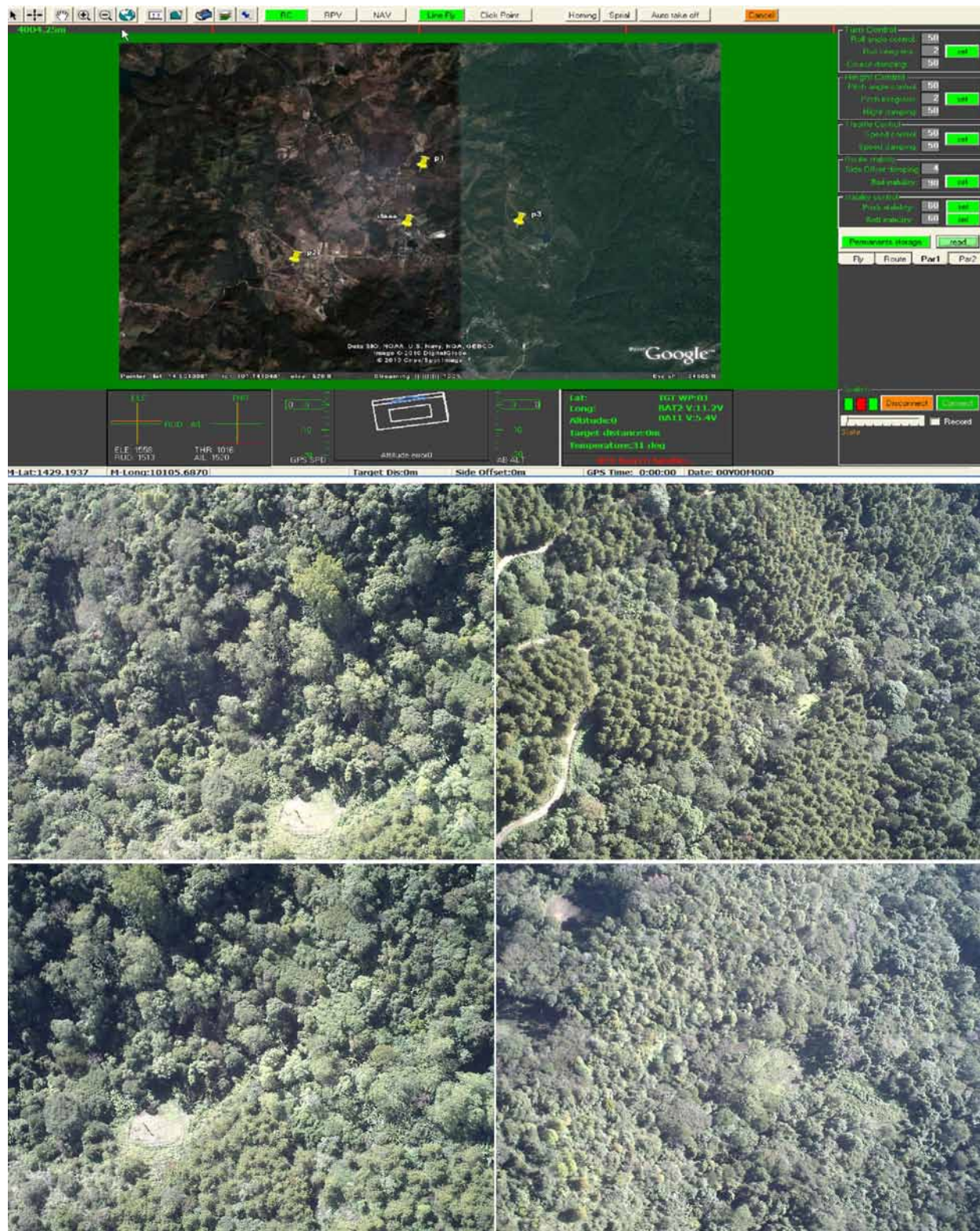


Figure 2: Aerial photos taken by UAV in ground opium poppy survey mission at Omkoi district, ChiangMai province

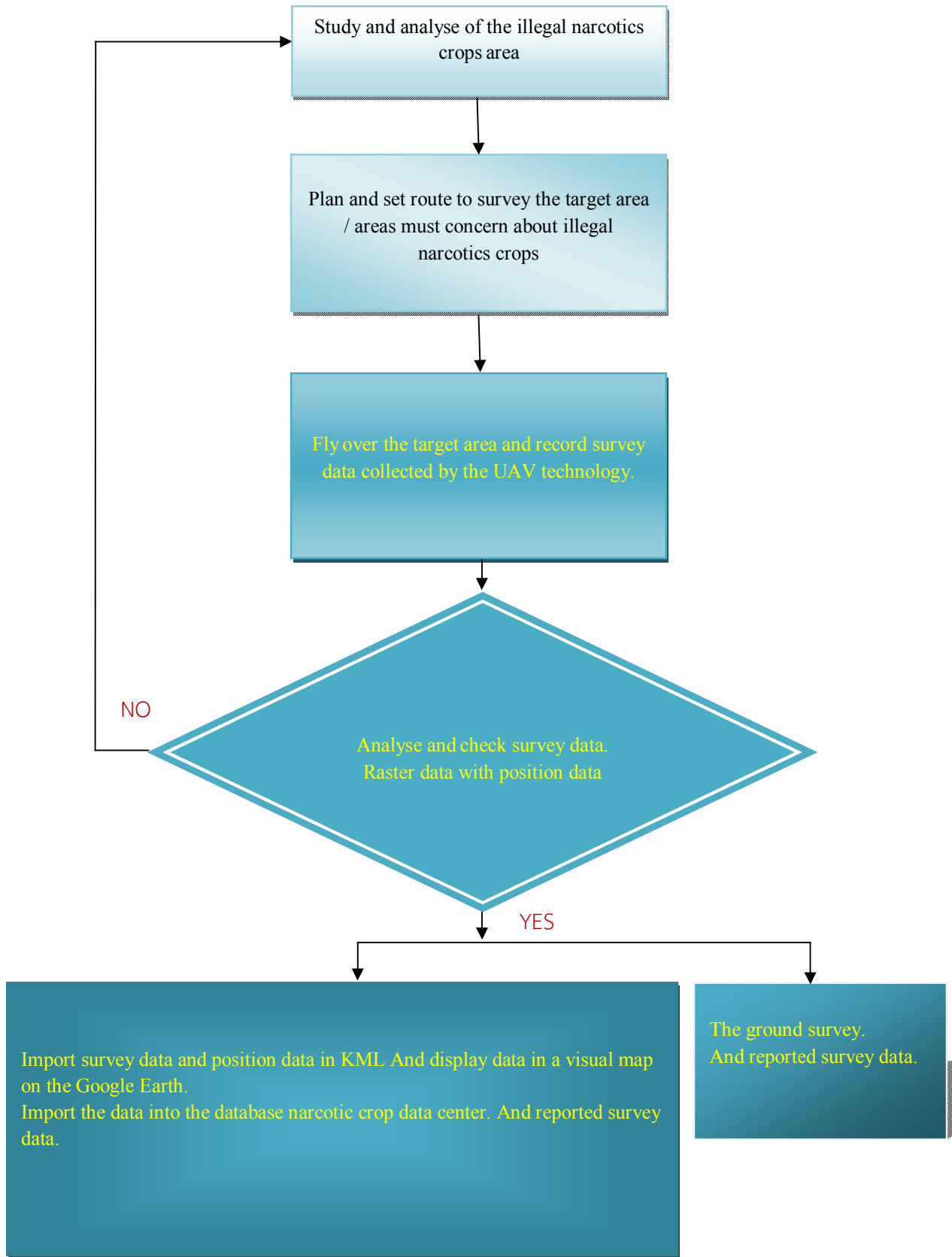


Figure 3: Work Flow of UAV technology in narcotic crops survey



Figure 4: Flying over the target area and record survey data collected by the UAV technology

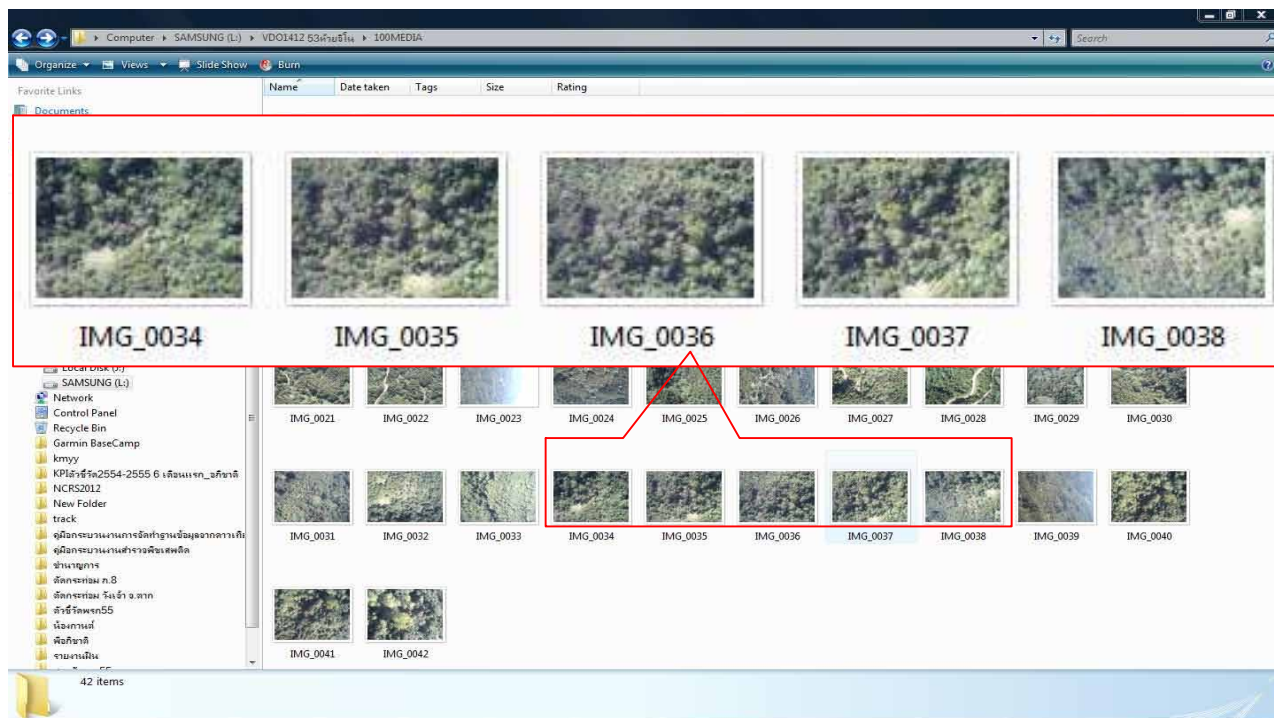


Figure 5: Analyse and check survey data. Raster data with position data.

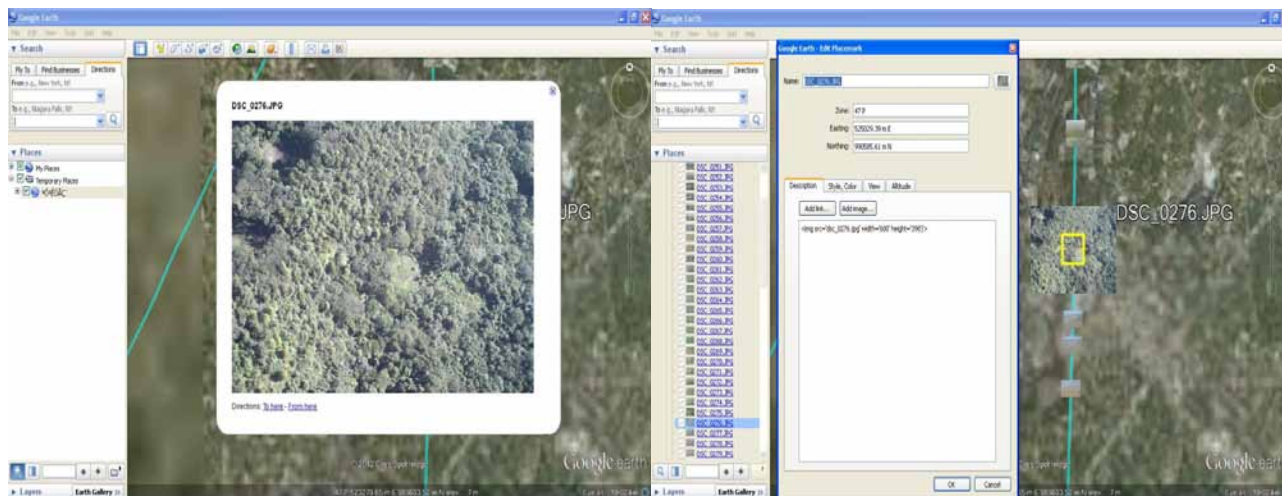


Figure 6: Import survey data and position data in KML And display data in a visual map on the Google Earth. Import the data into the database narcotic crop data center. And reported survey data.

4. ADVANTAGES

Narcotic Crops Survey and Monitoring Institute (NCSMI) need to study and develop methods to survey UAV system to be more effective. And survey data from the UAV to the map. to cut the target to destroy poppy fields. To provide convenience and save time and the budget. The eradication of the officers in each. And help solve the epidemic of opium poppy.