A Concept Note

A custom GIS for
national Desert Locust information officers
in locust-affected countries

Keith Cressman
FAO Senior Locust Forecasting Officer

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Background

RAMSES is a geographic information system (GIS) used by national locust information officers in nearly two dozen frontline countries affected by the Desert Locust to manage and analyze ecological, weather and locust data, including survey and control results in order to assess the current locust situation and determine the need for survey and control operations. Most of the data entered into RAMSES comes from eLocust, the handheld data logger used by locust officers in the field to record data and transmit it by satellite in real time to the national locust centre in the respective country. Each country exports RAMSES data and sends it to the Desert Locust Information Service (DLIS) at FAO Headquarters so that it can be imported into the SWARMS GIS used for global monitoring and forecasting. RAMSES was updated regularly since it became operational in 2000.

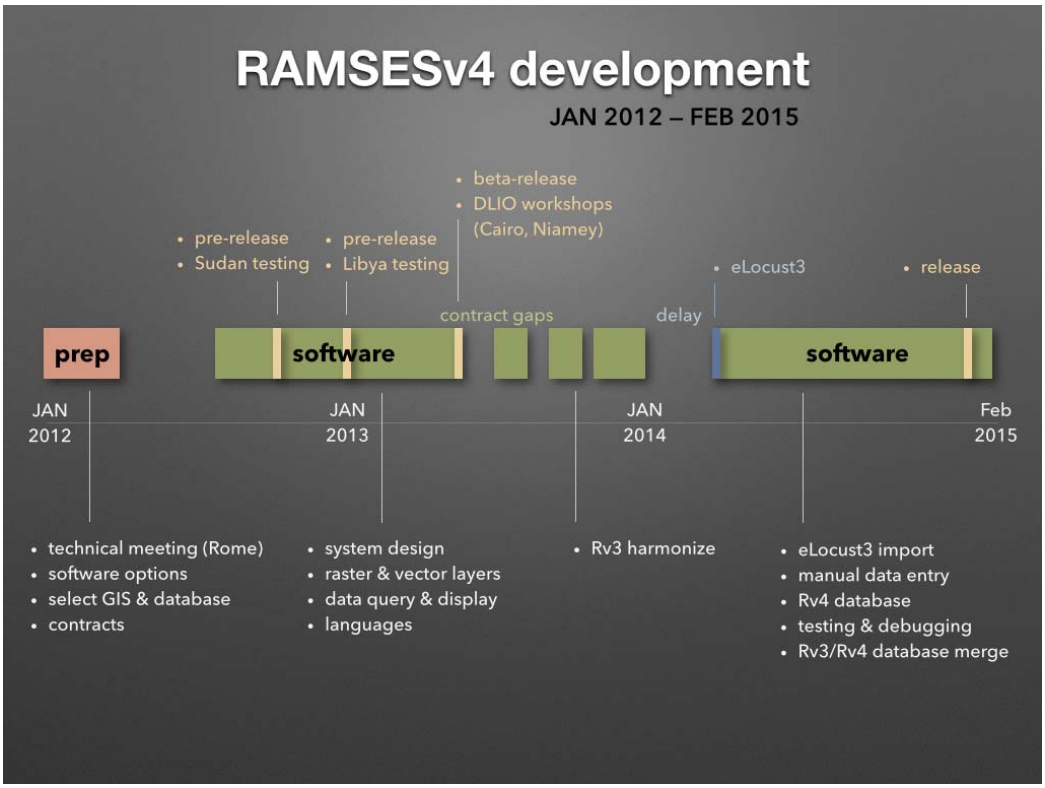
The latest version, RAMSESv3, suffered from numerous shortcomings. It relied on obsolete commercial GIS software (ArcView) that was no longer supported by the vendor but required a license. It used a database, MS Access, that had reached its technical limitations to manage the large volume of data. RAMSES was updated so many times in an ad-hoc manner that every country ended up with a different database version and format so countries could not exchange data easily. RAMSESv3 was cumbersome to operate and difficult to update. Lastly, it was not compatible with eLocust3 data.

Development of a new version

For these reasons, work started in 2012 to update the system to RAMSESv4 and take advantage of latest GIS advances by using open-source, platform-independent, license-free GIS and spatial database software, and designing a core system that can be easily updated by developing individual plug-ins, including different languages, specific analytical tools and other functions as desired by countries in the future. Therefore, the upgrading of RAMSESv3 involved a complete redesign and restructuring of the entire system.

A multi-national team consisting of two Java programmers, a database expert and three beta testers worked on RAMSESv4. Four of the six team members were from locust-affected countries and were very familiar with user needs and Desert Locust. Progress on RAMSESv4 was impeded by delays awaiting the finalization of eLocust3 and its associated database, and contractual gaps for the programmers due to inconsistent and irregular funding. A core system was built in which plugins could be added for additional functionality. The graphical user interface was completely redesigned in an ergonomic and intuitive manner for query and display of raster (satellite imagery) and vector (survey and control) data.

Extensive efforts were undertaken to avoid the situation of maintaining different and separate databases in each country that were in different languages and incompatible with each other as a result of 15 years of ad-hoc RAMSESv3 updates. The first step was to develop a single unified RAMSESv3 database by examining two dozen national databases, harmonizing the data in each database, then merging the data into the new database, and finally removing any extraneous and duplicate fields. Based on this work, a completely new RAMSESv4 database structure was designed that could accommodate the new eLocust3 data as well as the unified RAMSESv3 data set. Once this was completed, the data prior to 2015 could be safely migrated from the unified RAMSESv3 data to the new RAMSESv4 database without losing any historical data. Starting on 1 January 2015, all new data were entered directly into the RAMSESv4 database.



The first operational version of RAMSESv4 was released to frontline Desert Locust-affected countries on 1 January 2015 in English, French and Arabic. This is a basic version for importing, checking and correcting eLocust3 data, manually entering data, querying and displaying data on static and dynamic background maps, and exporting data for the global GIS used by DLIS for monitoring and early warning. Additional data management and analytical functionality will be distributed in the form of regular small updates according to user needs and the availability of funding.

The future: training and support to ensure sustainability

The three FAO regional Desert Locust commissions have agreed and confirmed that DLIS should continue to organize at least one inter-regional (for all users) or regional (for users in each region) RAMSESv4 workshop every year to exchange experiences and ensure that locust information officers are adequately trained to use RAMSESv4 to its maximum potential. These workshops could be supplemented by additional training provided by specialized institutes familiar with RAMSESv4 such as the Centre Royal de Télédétection Spatiale (CRTS) in Morocco and on-the-job training provided during FAO technical backstopping missions to countries.

As FAO Regular Programme funds are no longer available to maintain and update RAMSES, each Commission has set aside a small portion of their budget for GIS support. These funds will be used to develop additional functionality in the form of custom plug-ins, for example, for data summary and analysis tools, Desert Locust egg and hopper development model, incorporation of new remote sensing products (e.g. Dynamic Dryness Map, high resolution Soils Map, Soil Moisture Map, etc.), and new PROBA-V and Sentinel 3 satellite imagery. The funds would be for contracting programmers to develop the plug-ins.

As RAMSESv4 is currently validated to work under Windows 7, these funds could also be used to ensure compatibility with future Windows operating system updates (e.g. Windows 8, Windows 8.1 and beyond). To avoid this situation and reduce development and maintenance costs, it may be advisable to consider using RAMSESv4 on a single standard platform and operating system in all countries.

For more information

http://www.fao.org/ag/locusts/en/activ/DLIS/Rv4/index.html
eclo@fao.org