

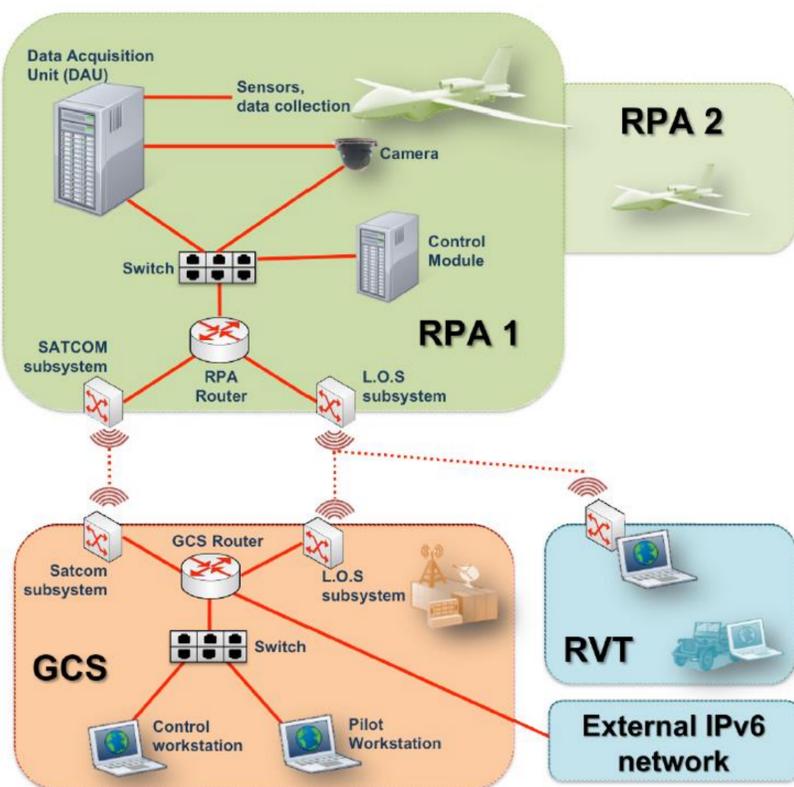
Communication architecture of a next generation RPAS: design, deployment and campaigns

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Introduction

- Remotely Piloted Aircraft Systems (RPAS) comprise a number of unmanned aircrafts that carry payloads, Ground Control Stations (GCS) that allow the operator to control the system, communication systems to send commands to the planes and supplementary equipment like remote video terminals (RVT).
- Integration of RPAS as part of the network centric warfare is a very important milestone because of the huge amount of data they control.
- This poster presents a recent practical experience [1] deploying an all-IP communications architecture into one of the most relevant Spanish tactical RPAS, the SIVA, property of the INTA [2].

Architectural design



Design requirements

- Support of several RPAs and GCSs.
- Automatic data link selection (LOS, satellite).
- Fine grained network level security (IPsec).
- Support of RVT.
- Communication with external IPv6 networks .

References

[1] *Diseño de red de comunicaciones para UAVs de nueva generación* F. Valera, I. Vidal, M. Bagnulo, M.A. Díaz, C. Vidal, J. Díez, D. Díez, L. de Berrazueta, D. González, C. Crego y A. López Congreso Nacional de I+D en Defensa y Seguridad, DESEi+d 2013. ISBN: 978-84-7402-399-2

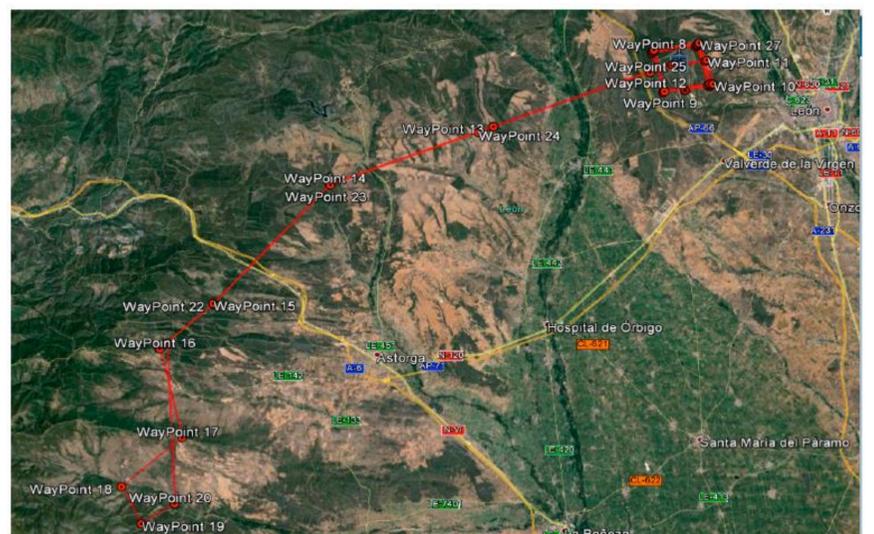
[2] *SIVA. Air Surveillance System*. Instituto Nacional de Técnica Aeroespacial "Estaban Terradas". April 2014. http://www.inta.es/doc/programasaltatecnologia/avionesnotripulados/siva_web.pdf

Campaigns and results

- The implementation of the TCP/IP communication system was integrated into the SIVA (see picture below [2]) and several ground tests were scheduled to verify its appropriate operation.



- In order to verify the operation of the SIVA RPAS with the IP-enabled communication system during real flights, several campaigns were conducted.
- The last of these campaigns took place on the military base *Conde de Gazola* (Leon, Spain). The mission planning uploaded to the SIVA is shown in the following Google Maps picture.



- The figure below shows the throughput of the telemetry information received by the GCS during a period of flight that covers the aircraft landing, being the continuous line the throughput via the LOS link, protected by IPsec and the dotted one, the same traffic after decryption at the GCS.

