Authentication Formats for UAS

draft-wiethuechter-tmrid-auth-03
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Background

- ASTM Standard from F38 Committee
  - WK65041: New Specification for UAS Remote ID and Tracking
  - Passed ballot Nov 7th, will become available soon

- Authentication message
  - 5 pages long with a 109 byte max payload (17 + 23 * 4)
  - Design driven to authenticate atomic message and carry certs
Bluetooth Background

• Why so small?
  • Bluetooth 4 legacy frames only give 25 bytes to play with (after Bluetooth headers)
  • 1 byte is for a main header in Open Drone ID (ODID) that is always present – now only 24 bytes
  • Auth message has its own header + other fields
• HHIT can be looked up to obtain HI from DNS, thus allowing verification of HHIT being genuine

• Payload is used to generate Signature
  • Must have some sort of dynamic field in data to be signed, Trust Timestamp could be used for this if Payload static

• Signature can be verified using HI + Auth message fields
Trusted [Vector] Message

• Base format (left image)
• An example using Vector message (right image)
  • Vectors are dynamic so at minimum just the 25 byte Payload needs to be signed
• Prototype of format developed at AX Enterprize
  • Currently only the send side of operation with manual verification test
Signed Hash Lists

- Provides provenance to previously sent messages (left image)
  - Agility through H-Alg and H-Len fields
  - Pseudo-blockchain hashes to link signed lists together
- Could also use idea in wrapper format (right image)
  - Removes pseudo-blockchain hashes, lowers count
- Is the number of hashes worth it?
HIP Based Offline Authentication

- Currently unobtainable with ASTM format
  - Need at least 10 pages, not 5 pages

- DEV side
  - HHIT and Signature validation can be done without any lookups

- AUTH side
  - Registry HHIT and SIG to show, without lookup, the registry UA belongs in
  - Local cached list of Registries on Observer device
  - Trust can be asserted from information if desired

- Further lookups and validation once connectivity restored for Observer
Future Work Needed

• Work with ASTM on expanding 5 pages to 10 pages
  • Format might migrate into ASTM instead of staying in IETF
• Format; improvements?
• Draft work
  • Security/IANA Considerations
  • Missing prose anywhere?
• Development of prototypes
  • Wrapper Message (receive side)
  • Signed Hash Lists
Today's consumers who order their drones off the internet don’t know the joy of going out in nature and returning with a drone that you caught yourself, whose angry owners you fought off with your own two hands.”
https://xkcd.com/2208/
Backup Slides
BT4 Single & Multi packet

Bluetooth 4 Headers (19 bytes)

Open Drone ID Vector Message (24 bytes)

CRC

Bluetooth 4 Headers (19 bytes)

Opaque Authentication Data (17 bytes)

CRC

Bluetooth 4 Headers (19 bytes)

Auth. Header

ODID Header

Opaque Authentication Data (23 bytes)

CRC