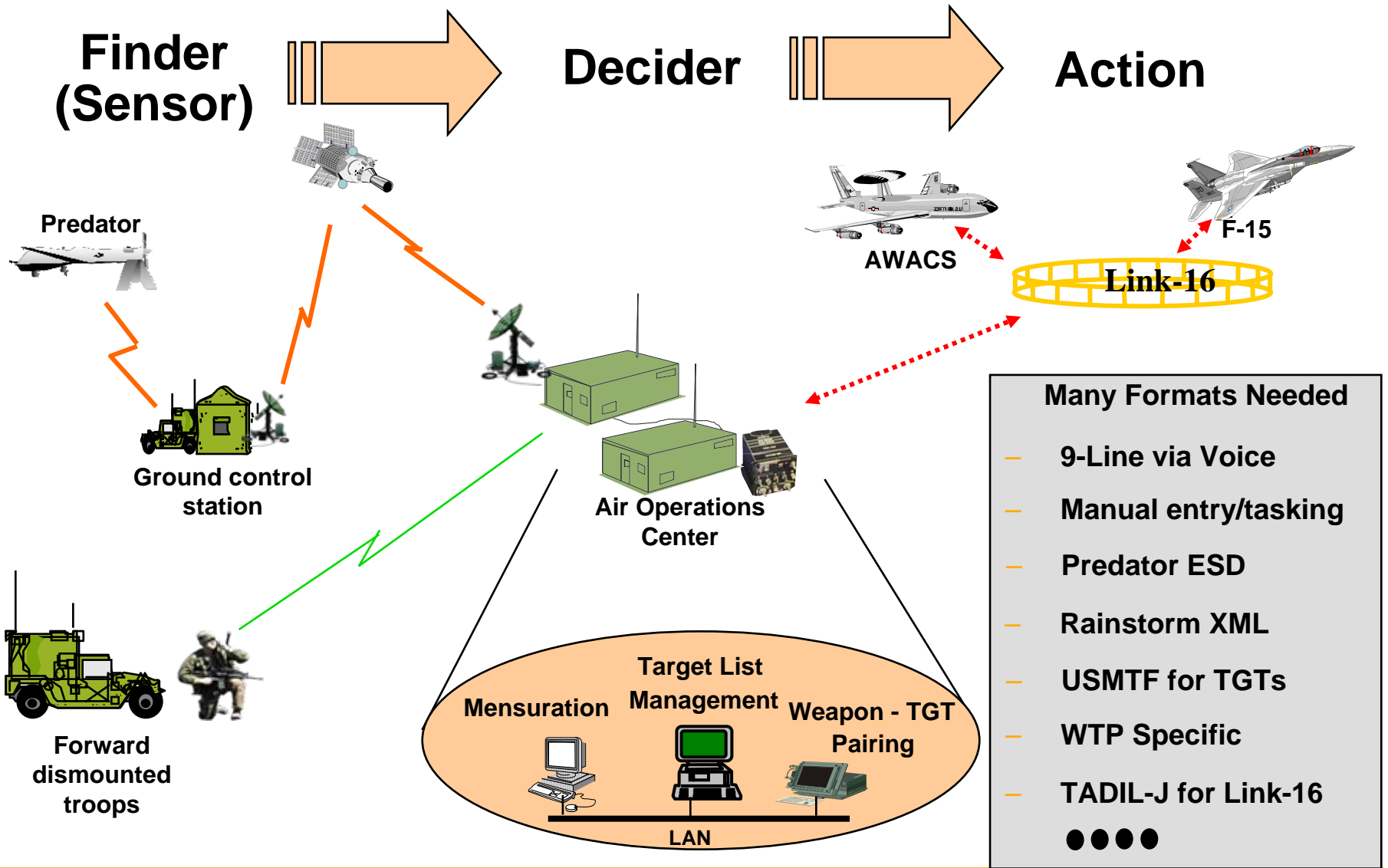




Cursor On Target

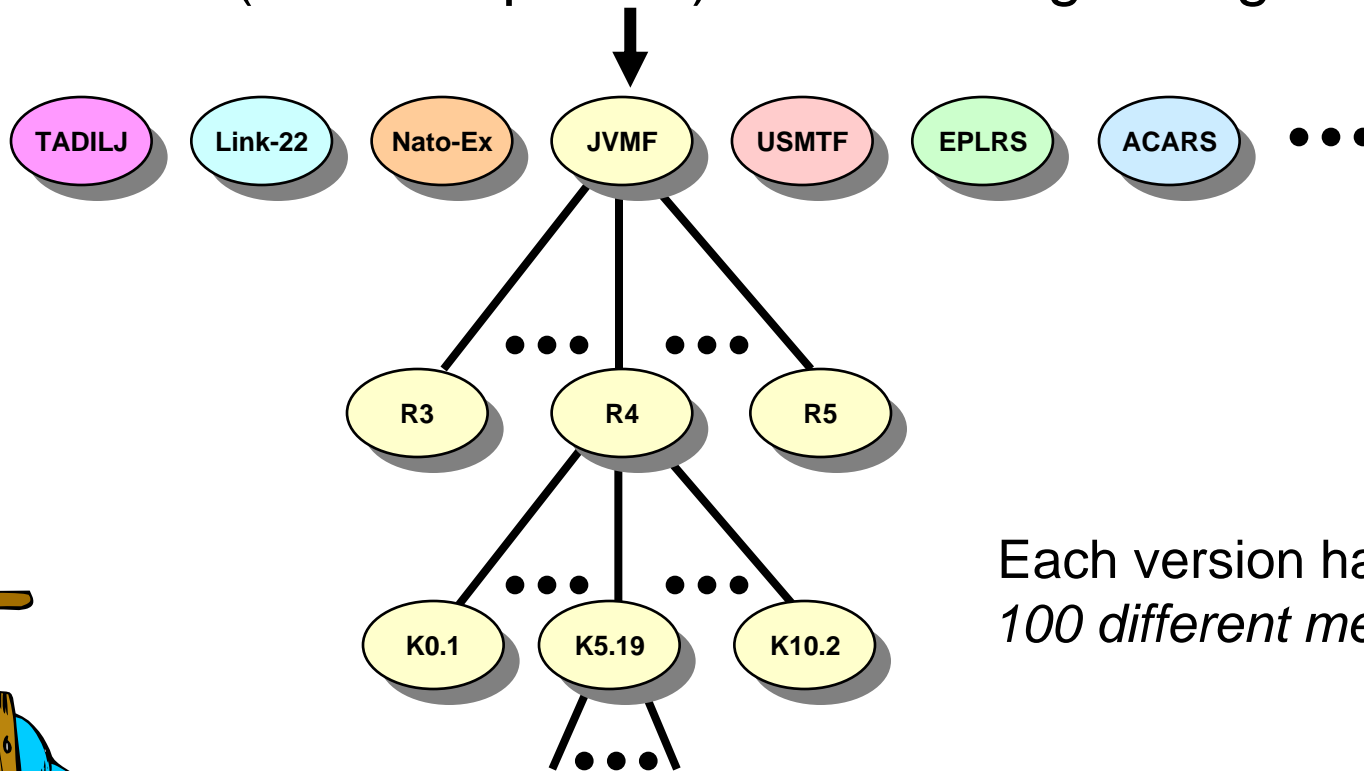
Dr. Christopher Niessen
The MITRE Corporation

Interoperability Example: Time Sensitive Targeting Messaging



Complexity of Standards Hampers Improvement

5 JVMF (non-compatible) versions & growing



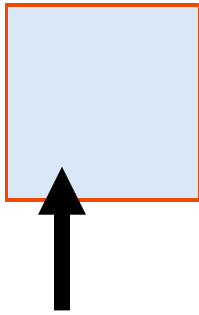
Each version has about
100 different messages

18,014,398,509,482,000 variations

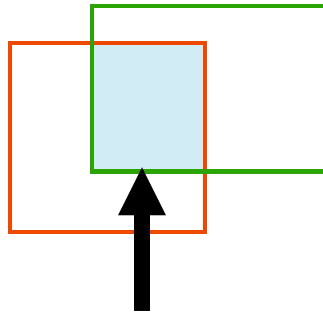
Never Fully Built & Subsets Are Different!



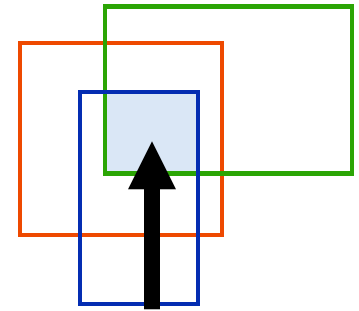
A Way Out – Loose Couplers Focus on Intersection not Union



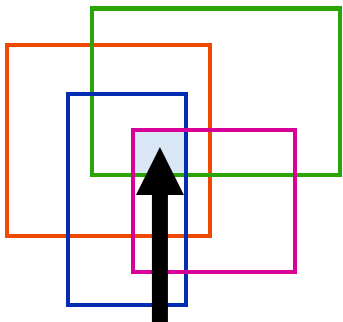
One system,
Intersection is
everything



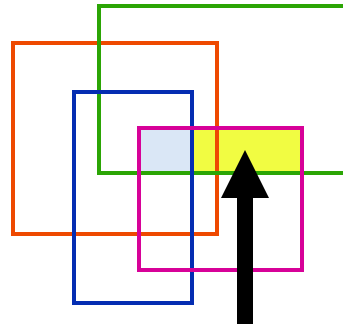
Two systems,
much less is
common



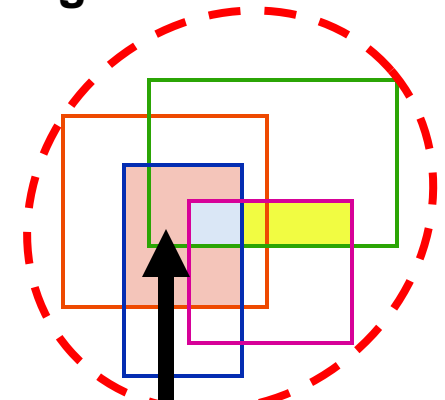
Three systems,
Intersection
gets smaller



More systems,
intersection
keeps shrinking

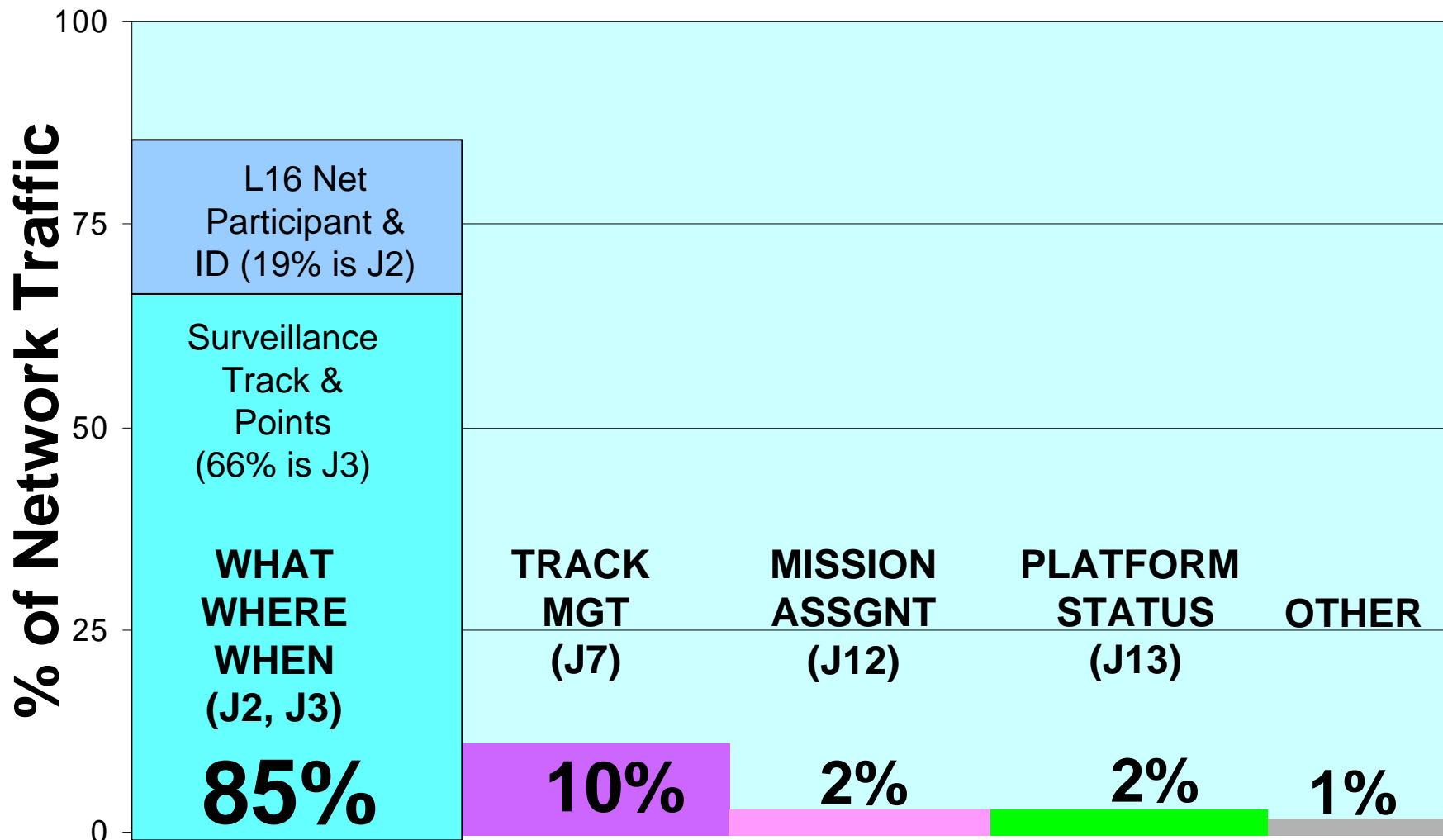


Green & Purple
can form a
sub-schema



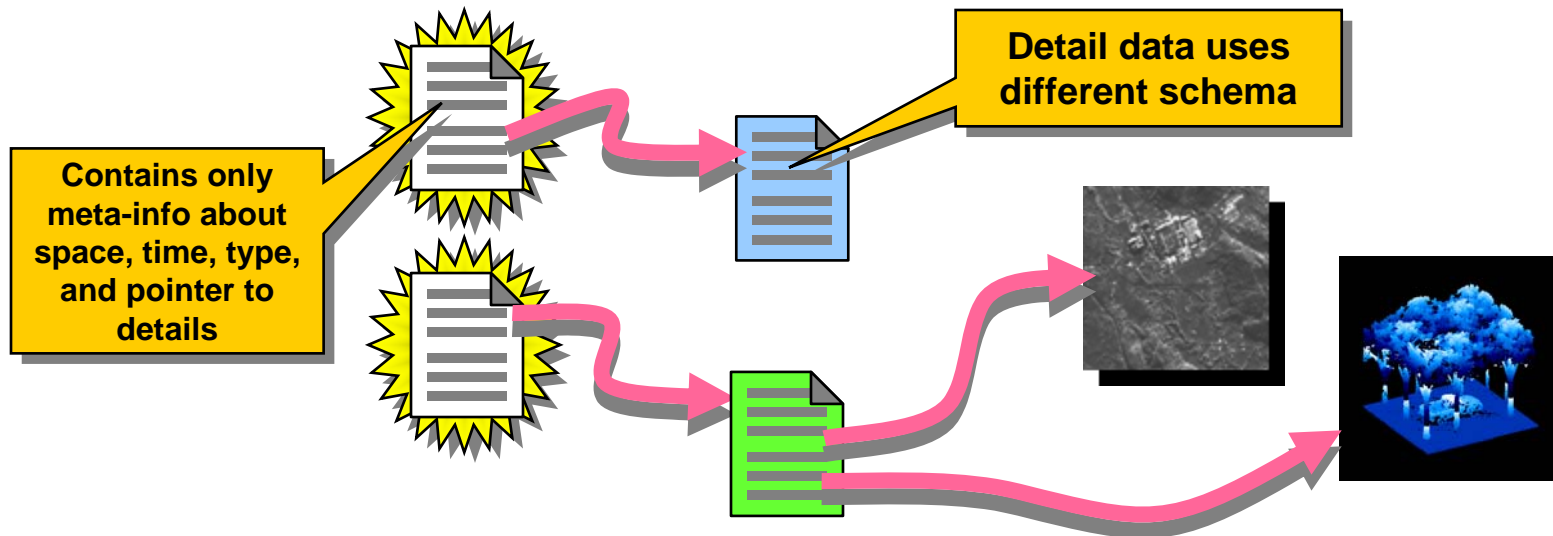
Other COIs
can have
sub-schemas

Look at What's Used, not Spec'd - TADIL-J Message Usage



Why Is This “Common Format” Different?

- Makes extensive use of information *encapsulation* and XML for *simple, extensible, hierarchical, machine-readable* schemas



- Top level schema contains very little, but offers a lot:
 - *<what>* - { *observation* | *capability* | *tasking* | *reservation* }
 - *<where>* - actually a “volume” of space
 - *<when>* - actually an “interval” of time
 - *<details>* - embeds the next level of detail

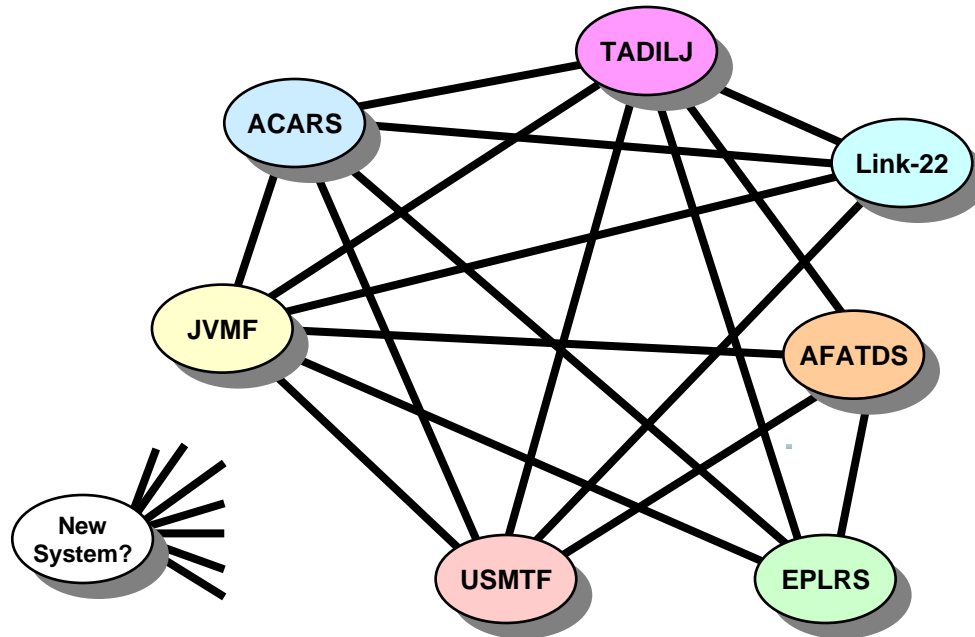
Example: UAV Domain



Summary- CoT Approach:

- **Doesn't Try to Do Everything—Just the most important**
 - Minimum set of key information common to all systems (What, Where, When and explicit quality)
 - Provide “hooks” for arbitrary extension
- **Use Simple Standard (XML)—Backward compatible**
 - Adaptable by nearly all systems with only modest efforts (from \$2 processors to \$200,000 terminals)
- **Network-centric—Cost and Value Scalability**
 - Cost grows as N users, not N squared
 - Value grows as N squared, not N
 - Entirely open (no licensing fees, no “secrets”)
- **Readily Reconfigurable—Approach handles unforeseen needs**
 - Using publish and subscribe, new ‘finders’, ‘deciders’, ‘shooters’, and mission threads can be created rapidly without large-scale coordination
- **Gaining wide spread acceptance and usage**
 - 90+ US DoD from proof of concept prototype to fielded systems of record using CoT

One Approach: Numerous Complex Translators



This is a long-term interoperability and maintenance nightmare...

(E.g., When MIL-STD-6016C comes out, how many systems must change?)

(E.g., How many systems implement “the full” standard?)

(E.g., How do you “synchronize” rollout of standards versions?)

(E.g., Will I need to carry *another* radio to talk to a new link?)

Key Observation: Most Tactical Data Needs are Very Similar

- Similar exchange of time-sensitive position info is crucial for
 - Blue-force tracking
 - Spot reports
 - Air space deconfliction
 - Unattended sensor monitoring
 - Sensor queuing
 - Real-time targeting
 - Materiel management
 - ...
- Network power increases rapidly with the number of users
 - Want all users to have potential access
- Create a **common neutral XML format** (Cursor on Target) for **just the key items** that participants translate to for extensible machine-to-machine meta-data tagging (**scales as N vs N^2**)



But What's the XML *Really* Look Like?

- The **key** information (What, Where, When) is contained in the root schema, “dumb” apps need nothing more.
- Additional “details” are added (and removed) as needed by individual producer/consumer **communities**

```
<?xml version='1.0' standalone='yes'?>
  <event version='2.0' uid='H#File12#16' time='2003-08-04T18:41:09.00Z' start='2003-08-04T18:41:09.00Z'
  stale='2003-08-05T18:41:09.00Z' type='a-h-G-E-W-A-L' how='m-i' >
  <point lat='30.632015000' lon='-86.736893333' le='3.300000' hae='11.439421' ce='3.000000' />
  <detail>
    <_flow-tags_ debug="2005-10-12T11:28:04.00Z" />
    <track course="120.1" speed="23.9"/>
    <mensuration . . . />
  </detail>
</event>
```

Deployed UAVs Using Cursor on Target for SA



Predator

UAV SA JFCOM Cmdr. James M. Joyner, called the cursor-on-target scheme "a de facto standard for tactical system integration." (1/06/05)

"we are using the C2PC COT adapter for our Scan Eagle UAV's. ..working extremely well...we want more!"
S/F, Maj Rob Buzby
IMEF Info Management Officer
Camp Fallujah Iraq (11/12/04)



Pioneer



Scan Eagle

DEPSECDEF initiative recommending CoT for sharing UAV SA