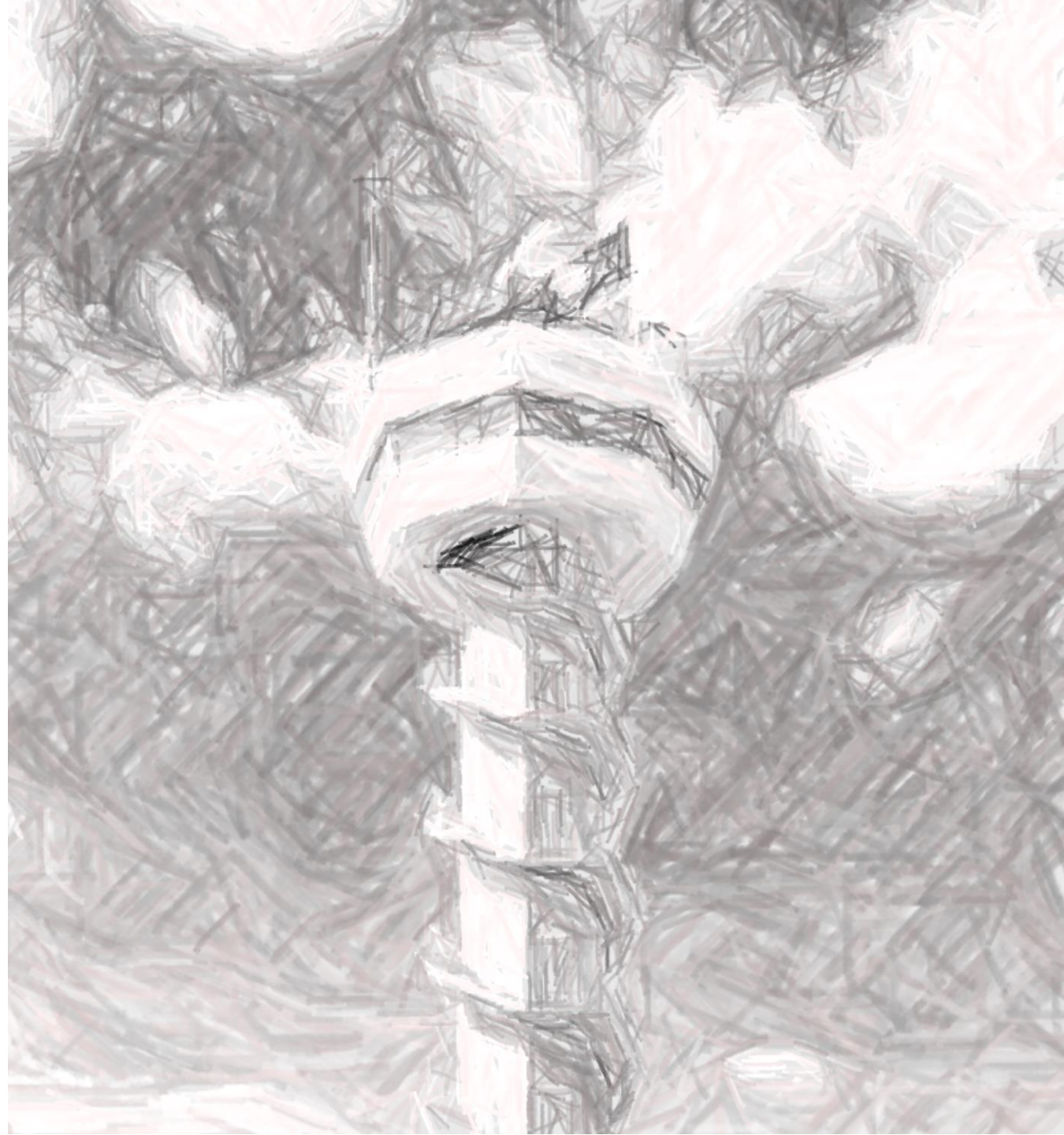




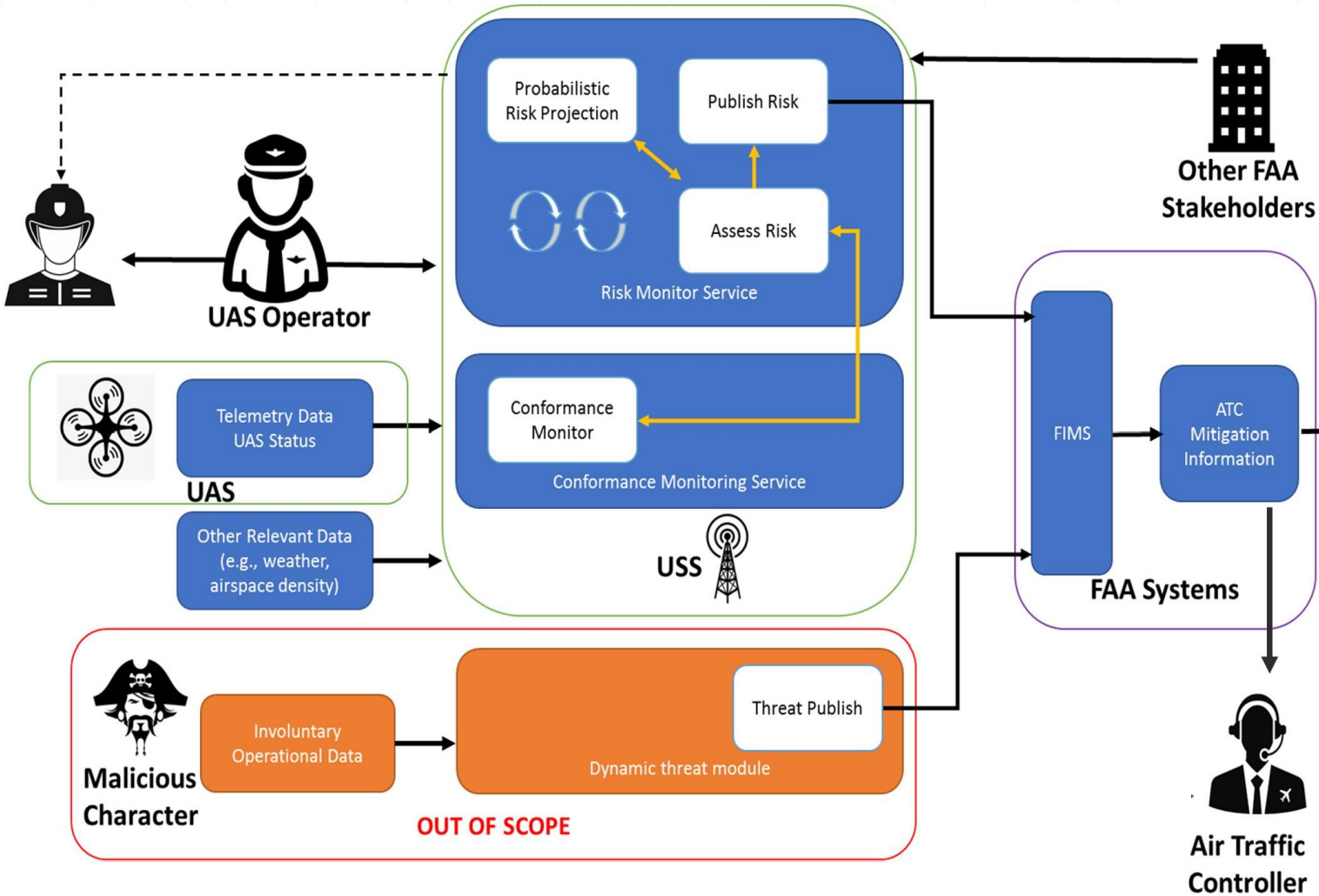
MOSAIC ATM

Data Required for Real-time
Risk Modeling of Off-
Nominal UAS

November 16, 2022



System Context and Data Required by USS



From UAS Operator

- sUA Characteristics
- Operational Intent (OI), Updated OI
- Position Reports
- Status Reports

From FAA

- UAS Facility Maps (UASFMs)
- Likelihood data
 - Unmitigated Collision Rates (UCRs)
- Severity data
 - Wichita State ASSURE Collision Severity
- SMS Risk Matrix and Thresholds

From SDSP

- Weather/Wind

Risk Message on KEFD Display



HIGH

Aircraft	
ID	d132f107-fdae-4009-a959-b5b3e5496be3
Type	sUAS_FW
Weight (lbs)	11.9
Cargo	N/A
Remarks	Blue with orange stripes
Est. Time Power Loss	2021-11-17T00:03:02Z

Last Known Position	
Time Measured	2021-11-16T21:09:46Z
Distance (nmi)	6.6
Bearing (deg)	16
Lat (DD)	29.7096521
Lon (DD)	-95.14208549
Alt (FT AGL)	210.0
Track (Deg True North)	235.0
Ground Speed (Knots)	34.0
Telemetry Available	Yes

Estimated Contingency Volume	
Effective End Time	2021-11-17T00:03:02Z
Max Alt (FT AGL)	82.021
Min Alt (FT AGL)	16.4042

Received:
2021-11-16T21:09:48Z

Previous: HIGH

Telemetry Risk Map
 Volume UASFM
 ATC Adjacent

A map of Houston, Texas, showing a large blue shaded area representing a risk message. The area is centered around the CSNA110 airport. The map includes labels for various locations such as Galena Park, Pasadena, South Houston, La Porte, Taylor Lake Village, Seabrook, Clear Lake Shores, Nassau Bay, and Webster. The map also shows major roads like TX 225, TX 226, TX 227, TX 228, TX 229, TX 300, TX 301, TX 302, TX 303, TX 304, TX 305, TX 306, TX 307, TX 308, TX 309, TX 310, TX 311, TX 312, TX 313, TX 314, TX 315, TX 316, TX 317, TX 318, TX 319, TX 320, TX 321, TX 322, TX 323, TX 324, TX 325, TX 326, TX 327, TX 328, TX 329, TX 330, TX 331, TX 332, TX 333, TX 334, TX 335, TX 336, TX 337, TX 338, TX 339, TX 340, TX 341, TX 342, TX 343, TX 344, TX 345, TX 346, TX 347, TX 348, TX 349, TX 350, TX 351, TX 352, TX 353, TX 354, TX 355, TX 356, TX 357, TX 358, TX 359, TX 360, TX 361, TX 362, TX 363, TX 364, TX 365, TX 366, TX 367, TX 368, TX 369, TX 370, TX 371, TX 372, TX 373, TX 374, TX 375, TX 376, TX 377, TX 378, TX 379, TX 380, TX 381, TX 382, TX 383, TX 384, TX 385, TX 386, TX 387, TX 388, TX 389, TX 390, TX 391, TX 392, TX 393, TX 394, TX 395, TX 396, TX 397, TX 398, TX 399, TX 400, TX 401, TX 402, TX 403, TX 404, TX 405, TX 406, TX 407, TX 408, TX 409, TX 410, TX 411, TX 412, TX 413, TX 414, TX 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The map also shows a small aircraft icon labeled 'GLF33' and another labeled 'CSNA110'. The map is overlaid with a large blue shaded area representing the risk message. The map is titled 'DAL 1004' and 'EFD'. The map is powered by Cesium Ion.

ASTM Standards Address Only OI and Position Data



- The ASTM UTM USS Interoperability Standard, developed by Int'l ASPs and Industry
 - General requirements on creation of OI (e.g., max vertices, 95% conformance target, max planning horizon).
 - Only Standard on USS Strategic Conflict Detection and Conformance Monitoring Services
 - Two cases
 1. Operator does not send position reports, detects/transitions to nonconformance/contingency, generates updated OI, sends to USS
 2. Operator sends position reports to the USS, USS detects nonconformance, and generates/uses updated Operational Intent.
 - The ASTM Remote ID Standard
 - General requirements regarding Position Data
 - ASTM Standards are flexible, rely on competent authorities to develop their own Methods of Compliance (MOCs) to the requirements
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Risk Model Data and ATM/ATC Implications

- Significant future work on inherent tradeoffs between controller perception of the alert and situational awareness of the off-nominal threat against the additional burden placed on the controller.
 - How coordination takes place for shared segments and what role the display should play
 - The use of telemetry and the integration with other controlled aircraft on the display
 - Recent discussions indicate some do not see a need for Real-Time Risk Model
 - Perceived lack of safety basis
 - Prefer to levy the responsibility on AVS (aircraft cert) to ensure BVLOS in UTM are appropriately certified so that they do not cause issues for other aircraft and ATC
 - Counter arguments exist
 - Move toward Mid-term with Dynamic data (airport config) and Mature with ATC positions to USS
 - Alternatives include UAS Operators call Flight Service Station (FSS) and FSS relays the information to ATC.
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