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This is a comprehensive request to document a state-of-the-art AECO workflow. The resulting document is a detailed, phase-by-phase plan illustrating how the diverse software and hardware listed integrate into a single, cohesive project delivery system for the New Franklin Data Center (NFDC).

📄 Workflow Document: New Franklin Data Center (NFDC)

Project Goal: Design, construct, and maintain a mission-critical, high-efficiency Data Center.

Core Principle: Data Continuity via the Autodesk Construction Cloud (ACC).

1. 🌐 Project Foundation and Team Structure

Role	Core Software	Hardware/Reality Capture	Key Responsibility
Project Lead/BIM Manager	ACC / BIM Collaborate / Revit	VR Headsets	Defines EIR/BEP; manages CDE and multidisciplinary coordination.
Geospatial Manager	**ESRI ArcGIS Pro** / TBC	**Trimble R12i GNSS**	Manages all ground control, GIS layers, and spatial data validation.
Lead Civil/Survey Engineer	**Civil 3D** / **TBC** / **PointCab**	**Trimble RTS** / **DJI L3**	Site grading, utility design, and processing reality capture data.
Lead Architect/Structural	**Revit** / Navisworks	VR Headsets	BIM Authoring, cloud worksharing, and clash resolution.
MEP/Systems Engineer	Revit / FABmep / ACC	**IF800 Drone** / **Sentera 6X Thermal**	Design and coordination of critical facility systems.
QA/QC Manager	**BlueBeam Revu + Studio** / ACC Build	**Trimble XGRIDS K1**	Documentation, submittals, field verification, and digital sign-offs.

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Role	Core Software	Hardware/Reality Capture	Key Responsibility
Reality Capture Specialist	PointCab Nebula	**DJI Matrice 300 RTK + Zenmuse L3**, **WingtraRAY**	Executes all site reality capture flights.

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2. 🗺️ Phase 1: Geospatial Context and Master Planning

Objective: Establish the authoritative spatial framework and context-rich base model.

Step	Software/Hardware Workflow	Output in ACC/CDE
2.1 Reality Capture	**WingtraRAY** performs wide-area photogrammetry. **DJI M300 RTK + Zenmuse L3** executes high-accuracy LiDAR for DTM (Digital Terrain Model) creation.	Raw point clouds and orthophotos uploaded to ACC Docs.
2.2 Survey Control	**Trimble R12i GNSS** sets high-accuracy Ground Control Points (GCPs). Data managed in **Trimble Access** and processed in **TBC** (Trimble Business Center).	Final, high-accuracy GCP report.
2.3 Reality Processing	**PointCab Origins** processes the raw point clouds, cleans noise, and generates clean meshes/DTMs. **PointCab Nebula** used for large-scale registration.	Clean, registered point cloud and DTM (published to ACC).
2.4 GIS Integration	**ESRI ArcGIS Pro** ingests DTM, utilities, zoning, and environmental layers. The **ArcGIS Connector for ACC** links these authoritative GIS layers to the CDE.	GIS Context Model (authoritative spatial data).
2.5 Site Validation (VR)	**Project Lead** uses **VR** to walk the site model, viewing terrain, slopes, and GIS overlays immersively to validate access and siting decisions.	Site Validation Report.
2.6 Civil Design Start	**Lead Civil Engineer** begins site grading and utility design in **Civil 3D**, referencing the DTM and GIS data directly.	Civil 3D Model (hosted in the cloud).

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3. 📐 Phase 2: Design, Coordination, and Intelligent Audit

Objective: Develop coordinated, clash-free models using cloud collaboration and AI/VR auditing.

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Step	Software/Hardware Workflow	Output in ACC/CDE
3.1 Co-Authoring	**Lead Architect** uses **Revit Cloud Worksharing** (via **BIM Collaborate Pro**). **Lead Civil Engineer** uses **Collaboration for Civil 3D** to share data references seamlessly in the CDE.	Live, Federated Models (Revit, Civil 3D, FABmep).
3.2 AI Design & Review	**Revit AI extensions** auto-route high-volume MEP systems and auto-check models against compliance standards (e.g., NFPA, building codes).	Automated Compliance Report.
3.3 Automated Clash Detection	**BIM Collaborate**'s **Model Coordination** module runs automated clash detection between all federated models (Civil, Structural, MEP).	Clash Groups and Automated Issues.
3.4 VR Coordination Review	**Architect** and **MEP Engineer** use **VR** to collaboratively walk through the model at clash locations flagged by **BIM Collaborate**. AI-suggested resolutions are reviewed in the immersive environment, and **Trimble SysQue** resolves the changes	Finalized Design Packages.
3.5 Non-Model Review	**QA/QC Manager** uses **BlueBeam Studio Sessions** for real-time collaborative markup and sign-off on non-model documents (specs, submittals, contracts).	Stamped and signed PDF documents.

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4. 🔨 Phase 3: Construction and Reality Monitoring

Objective: Field execution driven by digital data, validated by reality capture, and documented via mobile platforms.

Step	Software/Hardware Workflow	Output in ACC/CDE
4.1 Digital Layout	Field crew uses the **Trimble RTS** and **Field Link** to lay out critical points (footings, utility stub-ups) directly from the **Revit** and **Civil 3D** models stored in ACC.	Digital Layout Report (Trimble).
4.2 Earthwork Verification	**DJI L3** performs post-grading scan. **PointCab** registers the scan, and **Civil 3D** calculates volume comparison against the design model.	Volume Deviation Report.
4.3 Thermal QA/QC	**IF800 Drone** with **Sentera 6X Thermal Sensor** performs flyover of the building envelope, identifying heat leaks and insulation defects.	Thermal Imagery (Geotagged photos linked to building model).

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Step	Software/Hardware Workflow	Output in ACC/CDE
4.4 Field Documentation	**QA/QC Manager** uses **ACC Build** mobile app for safety checks and issue logging. **BlueBeam Revu** is used for precise field measurements and sheet markups, which are linked to the corresponding **ACC Issue**.	Daily Reports, Issues Log, and Field RFI/Submittals.
4.5 Large Vehicle Logistics (Twist)	**Lead Civil Engineer** uses **Vehicle Tracking** (in Civil 3D) to simulate the swept path of large concert buses/trailers over the temporary site paths during the **Santa Fe Trail Days** event.	Approved Traffic Control Plan (signed off via BlueBeam Studio).

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5. 🔁 Phase 4: Handover and Digital Twin Maintenance

Objective: Reconcile final conditions, formalize the As-Built model, and transition to Facilities Management (FM).

Step	Software/Hardware Workflow	Output in ACC/CDE
5.1 Final As-Built Capture	**XGRIDS K1** is used for rapid internal scanning of exposed MEP systems and complex structural elements before closeout.	Final As-Built Point Cloud.
5.2 As-Built Reconciliation	Point Cloud registered in **PointCab Nebula** and used to update the **Revit** model. Final model reviewed and published by **BIM Manager** to the **ACC Assets** module.	Final As-Built BIM (Level 300+ of Information).
5.3 Digital Handover	**ACC Assets** links model elements to warranties, O&M manuals, and asset tags. Final utility/spatial data pushed to **ESRI ArcGIS Pro** for the client's FM GIS layer.	FM-Ready Digital Twin.
5.4 VR Maintenance	Client FM team uses **VR** to walk the Digital Twin for maintenance planning. When a sensor reports an issue, the technician enters VR to visualize the asset's location and pull up its maintenance history (linked via ACC).	VR Asset Management System (Digital Twin in perpetuity).